Appendix A **Regulatory Background**

Regulatory Background

This appendix provides regulatory background for the project in terms of Federal, state, and local laws, ordinances, regulations, and planning guidance. This regulatory background indicates approvals that may be required for implementation of the project or contextual information to be considered in environmental analysis. Table A-1 presents a list of acronyms and abbreviations found in this appendix.

Table A-1. List of Acronyms and Abbreviations

AB Assembly Bill

ACHP Advisory Council on Historic Preservation

AG California Attorney General

Alquist-Priolo Act Alquist-Priolo Earthquake Fault Zoning Act

APE area of potential effects

ARB California Air Resources Board

ARPA Archaeological Resources Protection Act

basin plan water quality control plan

BCAQMD Butte County Air Quality Management District

BMP best management practice

Butte County FMP Butte County Flood Mitigation Plan

Butte County MHMP

Butte County Multi-Jurisdictional All-Hazard Pre-Disaster Mitigation Plan

Butte Regional HCP/NCCP

Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan

CAA Clean Air Act

CAFE Corporate Average Fuel Economy

Cal/EPA California Environmental Protection Agency
Caltrans California Department of Transportation

CAPCOA California Air Pollution Control Officers Association

Carl Moyer Program Carl Moyer Memorial Air Quality Standards Attainment Program

CBSC California Building Standards Code
CCA Community Choice Aggregation
CCR California Code of Regulations
CEQ Council on Environmental Quality
CEQA California Environmental Quality Act

CERCLA or Superfund Comprehensive Environmental Response, Compensation, and Liability Act

CESA California Endangered Species Act
CGS California Geological Survey
CNEL community noise equivalent level

CO carbon monoxide

CO₂e carbon dioxide equivalent

CRHR California Register of Historical Resources

CTR California Toxics Rule

CVFPB Central Valley Flood Protection Board

CVFPP Central Valley Flood Protection Plan

CWA Clean Water Act

dbh diameter at breast height

DO dissolved oxygen

DWR California Department of Water Resources

EFH essential fish habitat

EIR environmental impact report

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act
ESP energy service provider

FEMA Federal Emergency Management Agency

FIS Flood Insurance Studies

FRAQMD Feather River Air Quality Management District

FRWLP Feather River West Levee Project

GC Government Code

General Dewatering Order General Order for Dewatering and Other Low Threat Discharges to Surface Waters

GHG greenhouse gas

HCP habitat conservation plan

ICLEI International Council of Local Environmental Initiatives

ICW Inspection of Completed Works

IOU investor-owned utility
ISR Indirect Source Review
LCFS low carbon fuel standard
Ldn day-night average sound level

LGOP Local Government Operations Protocol

MBTA Migratory Bird Treaty Act
MOA memorandum of agreement

mpg miles per gallon

MPO metropolitan planning organization

MRZ Mineral Resource Zone

MS4 Municipal Separate Storm Sewer Systems

MS4 Permit National Pollutant Discharge Elimination System General Permit for Municipal

Separate Storm Sewer Systems

MT metric ton MW megawatt

NAGPRA Native American Graves Protection and Repatriation Act

NAHC Native American Heritage Commission NCCP natural community conservation plan

NCCPA Natural Community Conservation Planning Act

NEPA National Environmental Policy Act
NFIP National Flood Insurance Program
NHPA National Historic Preservation Act
NISC National Invasive Species Council
NMFS National Marine Fisheries Service

 $egin{array}{ll} NOI & notice of intent \\ NO_X & oxides of nitrogen \\ \end{array}$

NPDES National Pollutant Discharge Elimination System

NRHP National Register of Historic Places

NTR National Toxics Rule
OHWM ordinary high water mark

OPR Office of Planning and Research

PA programmatic agreement

PM particulate matter

PPMP pollution prevention and monitoring program

PRC Public Resources Code ROG reactive organic gas

RPS California's Renewable Portfolio Standard

RTP regional transportation plan

RWQCB regional water quality control board

SACOG Sacramento Area Council of Governments
SAFCA Sacramento Area Flood Control Agency

SB Senate Bill

SBFCA Sutter Butte Flood Control Agency
SCS sustainable communities strategy
SHPO State Historic Preservation Officer

SIP state implementation plan

SMARA Surface Mining and Reclamation Act of 1975

SOI sphere of influence

SR State Route

SWMP stormwater management plan SWPPP stormwater pollution prevention plan

TAC toxic air contaminant

TMDL Total Maximum Daily Load
ULDC Urban Levee Design Criteria
USACE U.S. Army Corps of Engineers
USFWS U.S. Fish and Wildlife Service

VMT vehicle miles traveled

WDR waste discharge requirement

A.1 Federal Plans, Policies, and Regulations

A.1.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) is the nation's broadest environmental law, applying to all Federal agencies and most of the activities they manage, regulate, or fund that have the potential to affect the environment. It requires Federal agencies to disclose and consider the environmental implications of their proposed actions. NEPA establishes environmental policies for the nation, provides an interdisciplinary framework for Federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that Federal agency decision makers take environmental factors into account.

NEPA requires the preparation of an appropriate document to ensure that Federal agencies accomplish the law's purposes. The Council on Environmental Quality (CEQ) has adopted regulations and other guidance that provide detailed procedures that Federal agencies must follow to implement NEPA.

This document is the instrument for NEPA compliance for the project under U.S. Army Corps of Engineers' (USACE's) authority, as described in Chapter 1, *Introduction*.

A.1.2 Federal Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires Federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS), to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. The required steps in the Section 7 consultation process are as follows.

- Agencies must request information from USFWS and/or NMFS on the existence in a project area of special-status species or species proposed for listing.
- Agencies must initiate formal consultation with USFWS and/or NMFS if the proposed action may adversely affect special-status species.

The project may affect special-status species. USACE and the Sutter Butte Flood Control Agency (SBFCA) are in coordination with USFWS and NMFS to initiate consultation under Section 7.

A.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird..." (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. Permits for take of non-game migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

Compliance with the MBTA would be addressed through compliance with the ESA and California Endangered Species Act (CESA). The project would incorporate mitigation measures that would help ensure that construction activities do not result in the take of migratory birds, as discussed in Section 3.9, *Wildlife*.

A.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds.

The project area does not contain bald eagle or golden eagle nesting habitat, and the project would not result in the take of bald or golden eagles. The project incorporates mitigation measures that would ensure that construction activities do not result in the take of any raptors, as discussed in Section 3.9, *Wildlife*.

A.1.5 Clean Water Act

The Clean Water Act (CWA) is the primary Federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

Section 303

California adopts water quality standards to protect beneficial uses of state waters as required by CWA Section 303 and the Porter-Cologne Water Quality Control Act of 1969 (see Section A.2.7). Section 303(d) of the CWA requires the identification of water bodies that do not meet, or are not expected to meet, water quality standards (i.e., impaired water bodies). In California, the State Water Board develops the list of water quality-limited segments and the Environmental Protection Agency (EPA) approves the state's list. The affected water body, and associated pollutant or stressor, is then prioritized in the 303(d) List. Section 303(d) also requires the development of a Total Maximum Daily Load (TMDL) for each listing. The current list, approved by the EPA, is the 2006 303(d) List.

In addition to the impaired water body list required by CWA Section 303(d), CWA section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) Integrated Report, which will address both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed a statewide 2010 California Integrated Report based upon the Integrated Reports from each of the nine regional water quality control boards (RWQCBs). The 2010 California Integrated Report was approved by the State Water Board at a public hearing on August 4, 2010, and the report was submitted to the EPA for final approval. Although updates to the 303(d) list must be finalized by the EPA before becoming effective, this updated 303(d) list will be used for this analysis in order to have the most up-to-date information available.

Section 401

Under the CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a Federal component and may affect state water quality (including projects that require Federal agency approval [such as issuance of a Section 404 permit]) must also comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Board, and applications for water quality certification under CWA Section 401 are typically processed by the RWQCB with local jurisdiction. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

The Feather River West Levee Project (FRWLP) is subject to CWA Section 401 certification as a condition of USACE's authority under the CWA Section 404.

Section 402

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Board is authorized by EPA to oversee the NPDES program through the RWQCBs (see related discussion regarding the Porter-Cologne Water Quality Control Act under state regulations, Section A.2.7). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

Construction General Permit

Dischargers whose projects disturb 1 or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres are required to file a notice of intent (NOI) to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Order No. 2010-0014-DWQ—General Permit). Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation, but do not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP), which must be completed before construction begins. The SWPPP should contain a site map that shows the construction site perimeter; existing and proposed buildings, lots, roadways, and stormwater collection and discharge points; general topography both before and after construction; and drainage patterns across the project. The SWPPP must list best management practices (BMPs) the discharger will use to protect stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for non-visible pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A (or Section XIV) of the Construction General Permit describes the elements that must be contained in a SWPPP.

Municipal Activities

CWA Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Phase 1 MS4 regulations cover municipalities with populations greater than 100,000, certain industrial processes, or construction activities disturbing an area of 5 acres or more. Phase 2 MS4 regulations require that stormwater management plans be developed by municipalities with populations smaller than 100,000 and construction activities disturbing 1 or more acres of land area.

Several of the cities and counties within the affected area have their own NPDES municipal stormwater permits for the regulation of stormwater discharges. Yuba City and Sutter County (joint program) as well as Butte County are permit holders under the general Phase 2 MS4 Permit (Order No. 2003-0005-DWQ) in the affected area. These permits require that controls are implemented to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these permit holders have created stormwater management plans for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects, project applicants would be required to follow the guidance contained in the stormwater management plans as defined by the permit holder in that location.

General Dewatering Permit

Although small amounts of construction-related dewatering are covered under the Construction General Permit, the Central Valley RWQCB has also adopted a General Order for Dewatering and Other Low-Threat Discharges to Surface Waters for which a permit is required (General Dewatering Permit). This permit applies to various categories of dewatering activities if construction required dewatering in greater quantities than that allowed by the Construction General Permit and the effluent is discharged to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the Construction General Permit. To obtain coverage, the applicant must submit an NOI and pollution prevention and monitoring program (PPMP) to the Central Valley RWQCB. The PPMP must include a description of the discharge location, discharge characteristics, primary pollutants, receiving water, treatment systems, spill prevention plans, and other measures necessary to comply with discharge limits. A representative sampling and analysis program must be prepared as part of the PPMP and implemented by the permittee, along with recordkeeping and quarterly reporting requirements during dewatering activities.

Municipal Separate Storm Sewer System Program (MS4s)

EPA defines an MS4 as any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that is designed or used for collecting or conveying stormwater. As part of the NPDES program, EPA initiated a program requiring that entities having MS4s apply to their local RWQCBs for stormwater discharge permits. The program proceeded through two phases. Under Phase I, the program initiated permit requirements for designated municipalities with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. Phase II expanded the

program to municipalities with populations less than 100,000, as well as small MS4s outside the urbanized areas that are designated by the permitting authority to obtain NPDES permit coverage for their stormwater discharges.

Generally, Phase I MS4s are covered by individual permits and Phase II MS4s are covered by a general permit. Each regulated MS4 is required to develop and implement a stormwater management program to reduce the contamination of stormwater runoff and prohibit illicit discharges.

Section 404

Section 404 of the CWA requires that a permit be obtained from USACE for the discharge of dredged or fill material into "waters of the United States, including wetlands."

Waters of the United States include wetlands and lakes, rivers, streams, and their tributaries. *Wetlands* are defined for regulatory purposes, at 33 CFR § 328.3 as:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; (2) All interstate waters, including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs 1–4 in this section; (6) The territorial seas; and (7) Wetlands adjacent to waters identified in paragraphs 1–6 in this section.

CWA Section 404(b) requires that USACE process permits in compliance with guidelines developed by EPA. These guidelines (404[b][1] Guidelines) require that there be an analysis of alternatives available to meet the project purpose and need, including those that avoid and minimize discharges of dredged or fill materials in waters. Once this first test has been satisfied, the project that is permitted must be the least environmentally damaging practicable alternative before USACE may issue a permit for the proposed activity.

Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed following USACE protocols to determine whether the affected area contains wetlands or other waters of the United States that qualify for CWA protection. These areas include:

- Sections within the ordinary high water mark (OHWM) of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

[Note: Section 404 does not apply to authorities under the Rivers and Harbors Appropriation Act of 1899, except that some of the same waters may be regulated under both statutes; the USACE typically combines the permit requirements of Section 10 and Section 404 into one permitting process.]

A.1.6 River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water, or that place obstructions to navigation outside established Federal lines and excavate from or deposit material in such waters.

Such activities require permits from USACE. *Navigable waters* are defined in Section 329.4 of the act as:

Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity.

Section 9

Section 9 (33 USC 401) prohibits the construction of any bridge, dam, dike, or causeway across any navigable water of the United States in the absence of congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the water body lie wholly within the limits of a single state, the structure may be built under authority of the legislature of that state, if the location and plans or any modification thereof are approved by the Chief of Engineers and by the Secretary of the Army.

Section 10

Section 10 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been authorized by the Chief of Engineers.

Section 13

Section 13 (33 USC 407) provides that the Secretary of the Army, whenever the Chief of Engineers determines that anchorage and navigation would not be injured thereby, may permit the discharge of refuse into navigable waters. In the absence of a permit, such discharge of refuse is prohibited. While the prohibition of this section, known as the Refuse Act, is still in effect, the permit authority of the Secretary of the Army has been superseded by the permit authority provided the Administrator, EPA, and the states under Sections 402 and 405 of the CWA, respectively.

As described above, the proposed project may affect waters of the United States under Section 404 and navigable waters under the Rivers and Harbors Appropriation Act of 1899. Consultation with USACE is in progress.

Section 14

Under Section 14 (33 USC 408) temporary or permanent alteration, occupation, or use of any public works, including levees, for any purpose is only allowable with the permission of the Secretary of the Army. Under the terms of 33 USC 408, any proposed levee modification requires a determination by the Secretary that the proposed alteration, permanent occupation, or use of a Federal project is not injurious to the public interest and will not impair the usefulness of the levee. The authority to make this determination and approve modifications to Federal works under 33 USC 408 has been delegated to the Chief of Engineers, USACE. Minor modifications to flood control facilities have been further delegated via Section 208 (33 CFR 208.10) to the District Engineer.

Section 208 (33 CFR 208.10)

While not technically part of the Rivers and Harbors Act, as introduced above, Section 208 (33 CFR 208.10) authorizes the USACE District Engineer to approve relatively minor, low impact alterations/modifications related to the operation and maintenance responsibilities of the non-Federal sponsors, provided these alterations and modifications do not adversely affect the functioning of the project and flood fighting activities. The project is considered to fall under Section 408, as described in the preceding paragraph, the process for which includes and goes beyond the Section 208 District Engineer level to the Chief of Engineers.

A.1.7 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act establishes a management system for national marine and estuarine fishery resources. This legislation requires that all Federal agencies consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase *adversely affect* refers to the creation of any effect that reduces the quality or quantity of essential fish habitat. Federal activities that occur outside of an essential fish habitat but that may, nonetheless, have an effect on essential fish habitat waters and substrate must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered. The Magnuson-Stevens Act states that consultation regarding essential fish habitat should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, Fish and Wildlife Coordination Act, CWA, and ESA. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and if the notification meets requirements for essential fish habitat assessments.

USACE and NMFS are in coordination to determine the EFH compliance documentation appropriate for the FRWLP.

A.1.8 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act in general requires Federal agencies to coordinate with USFWS, NMFS, and state fish and game agencies whenever streams or bodies of water are controlled or modified. This coordination is intended both to promote the conservation of wildlife resources by providing equal consideration for fish and wildlife in water project planning and to provide for the development and improvement of wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to include recommendations made by USFWS and state fish and game agencies in project reports, and give full consideration to these recommendations.

USACE and SBFCA are in coordination with the resource agencies in accordance with the act.

A.1.9 Farmland Protection Policy Act and Memoranda on Farmland Preservation

Two policies require Federal agencies to include assessments of the potential effects of a proposed project on prime and unique farmland. These policies are the Farmland Protection Policy Act and the Memoranda on Farmland Preservation, dated August 30, 1976, and August 11, 1980, respectively, from the CEQ. Under requirements set forth in these policies, Federal agencies must determine these effects before taking any action that could result in converting designated prime or unique farmland for non-agricultural purposes. If implementing a project would adversely affect farmland preservation, the agencies must consider alternative actions to lessen those effects. Federal agencies also must ensure that their programs, to the extent feasible, are compatible with state, local, and private programs to protect farmland. The Natural Resources Conservation Service is the Federal agency responsible for ensuring that these laws and policies are followed.

The project may affect farmland adjacent to the levee, as discussed in Section 3.11, *Agriculture, Land Use, and Socioeconomics*.

A.1.10 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to evaluate the effects of their undertakings on historic properties, which are those properties listed or eligible for listing on the National Register of Historic Places (NRHP). Implementing regulations at 36 CFR Part 800 require that Federal agencies, in consultation with the State Historic Preservation Officer (SHPO), identify historic properties within the area of potential effects (APE) of the proposed project and make an assessment of adverse effects if any are identified. If the project is determined to have an adverse effect on historic properties, the Federal agency is required to consult further with SHPO and the Advisory Council on Historic Preservation (ACHP) to develop methods to resolve the adverse effects. The Section 106 process has five basic steps.

- 1. Initiate the Section 106 process, including the identification of consulting parties, such as Native American tribes.
- 2. Identify and evaluate cultural resources to determine whether they are historic properties.
- 3. Assess the effects of the undertaking on historic properties within the APE.
- 4. If historic properties may be subject to an adverse effect, the Federal agency, the SHPO, and any other consulting parties (including Native American tribes and the ACHP) continue consultation to seek ways to avoid, minimize, or mitigate the adverse effect. A memorandum of agreement (MOA) is usually developed to document the measures agreed upon to resolve adverse effects. Alternatively, the Federal agency may prepare and execute a programmatic agreement (PA) with the aforementioned parties to comply with 36 CFR 800, particularly in the context of complex undertakings that entail years of implementation actions or where the undertaking's effects on historic properties cannot be well characterized during the planning phase.
- 5. Proceed in accordance with the terms of the MOA or PA.

The efforts taken to identify cultural resources within the APE and any potential effects are discussed in Section 3.17, *Cultural Resources*. Consultation with SHPO is in progress.

A.1.11 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 is also applicable to Federal undertakings. This act established "the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites" (Public Law 95-431).

It is not anticipated that actions related to the project would conflict with the American Indian Religious Freedom Act. Consultation with the Native American Heritage Commission and the Sacred Lands database was negative for findings in the project areas, which is discussed in Section 3.17, *Cultural Resources*.

A.1.12 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (16 USC 1271 et seq.) establishes a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic, or recreational. The act designates specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added. The Feather River in the project area is not designated under this act.

A.1.13 Executive Order 11988 (Floodplain Management)

Executive Order 11988 (May 24, 1977) requires a Federal agency, when taking an action, to avoid short- and long-term adverse effects associated with the occupancy and the modification of a floodplain, and it must avoid direct and indirect support of floodplain development whenever there is a reasonable and feasible alternative. If the only reasonable and feasible alternative involves siting in a floodplain, the agency must minimize potential harm to or in the floodplain and explain why the action is proposed in the floodplain.

A.1.14 Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 (May 24, 1977) requires Federal agencies to prepare wetland assessments for proposed actions located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands. Section 3.8, *Vegetation*, describes effects on wetlands and mitigation measures for reducing significant effects for the project.

A.1.15 Executive Order 12898 (Environmental Justice)

Executive Order 12898 (February 11, 1994) requires Federal agencies to identify and address adverse human health or environmental effects of Federal programs, policies, and activities that could be disproportionately high on minority and low-income populations. Federal agencies must ensure that Federal programs or activities do not directly or indirectly result in discrimination on the basis of race, color, or national origin. Federal agencies must provide opportunities for input into the NEPA process by affected communities and must evaluate the potentially significant and adverse environmental effects of proposed actions on minority and low-income communities during environmental document preparation. Even if a proposed Federal project would not result in

significant adverse effects on minority and low-income populations, the environmental document must describe how Executive Order 12898 was addressed during the NEPA process.

Environmental justice issues are discussed in Section 3.12, *Population, Housing, and Environmental Justice*.

A.1.16 Executive Order 13007 (Indian Sacred Sites) and April 29, 1994, Executive Memorandum

Executive Order 13007 (May 24, 1996) requires Federal agencies with land management responsibilities to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies are to maintain the confidentiality of sacred sites. Among other things, Federal agencies must provide reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. The agencies must comply with the April 29, 1994, Executive Memorandum, *Government-to-Government Relations with Native American Tribal Governments*.

Based on the analysis described in Section 3.17, *Cultural Resources*, no sacred sites would be significantly affected by the implementation of the project.

A.1.17 Federal Clean Air Act

The Federal Clean Air Act (CAA) was enacted to protect and enhance the nation's air quality in order to promote public health and welfare and the productive capacity of the nation's population. The CAA requires an evaluation of any Federal action to determine its potential effects on air quality in the project region. California has a corresponding law, which also must be considered during the environmental impact report (EIR) process.

For specific projects, Federal agencies must coordinate with the appropriate air quality management district as well as with EPA. This coordination would determine whether the project conforms to the CAA and the state implementation plan (SIP).

Section 176 of the CAA prohibits Federal agencies from engaging in or supporting in any way an action or activity that does not conform to an applicable SIP. Actions and activities must conform to a SIP's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and in attaining those standards expeditiously. EPA promulgated conformity regulations (codified in 40 CFR 93.150 et seq.).

The potential air quality effects of the project resulting from construction (such as equipment emissions and fugitive dust) are discussed in Section 3.5, *Air Quality*, which analyzes and documents compliance with the CAA.

A.1.18 Federal Water Project Recreation Act

The Federal Water Project Recreation Act requires Federal agencies with authority to approve water projects to include recreation development as a condition of approving permits. Recreation development must be considered along with any navigation, flood control, reclamation, hydroelectric, or multi-purpose water resource project. The act states that,

consideration should be given to opportunities for outdoor recreation and fish and wildlife enhancement whenever any such project can reasonably serve either or both purposes consistently.

Recreation effects, such as temporary loss to river access, are described in Section 3.14, Recreation.

A.1.19 Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act enables EPA to administer a regulatory program that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

No materials classified as hazardous are proposed to be used for the project.

A.1.20 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (also known as CERCLA or Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

Hazardous waste sites are discussed in Section 3.16, Public Health and Environmental Hazards.

A.1.21 Wildlife Hazards on or Near Airports

The Federal Aviation Administration addresses control of hazardous wildlife in Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*. The Federal Aviation Administration provides direction on where public-use airports should restrict land uses that have the potential to attract hazardous wildlife. The Federal Aviation Administration recommends a distance of 10,000 feet separating wildlife attractants and aircraft movement areas. The area within a 10,000-foot radius of the Airport Operations Area is designated as the Critical Zone. The definition of wildlife attractants in Advisory Circular 150/5200-33A includes human-made or natural areas, such as poorly drained areas, retention ponds, agricultural activities, and wetlands. Advisory Circular 150/5200-33A recommends against the use of airport property for agricultural production within a 5-mile radius of the Airport Operations Area unless the income from the agricultural crops is necessary for the economic viability of the airport.

A.1.22 Sustainable Fisheries Act

In response to growing concern about the status of United States fisheries, Congress passed the Sustainable Fisheries Act of 1996 (PL 104-297) to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the Federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect EFH. EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term

sustainable fishery and contribute to a healthy ecosystem. The Feather River has been designated as EFH by the Pacific Fishery Management Council. As described in Section A.1.2, *Federal Endangered Species Act*, USACE and SBFCA are in coordination with USFWS and NMFS and consultation would be initiated under Section 7 with publication of the Draft EIS/EIR. That process would include consideration of and compliance with the Magnuson-Stevens Act to determine effects on EFH. At this time, it is considered that no EFH would be affected.

A.1.23 Uniform Relocation Assistance and Real Property Acquisition Policies Act

All or portions of parcels within the project footprint may need to be acquired to construct either of the action alternatives. Federal, state, local government agencies, and others receiving Federal financial assistance for public programs and projects that require the acquisition of real property must comply with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 (42 USC 4601 et seq.) (Uniform Act), and implementing regulation, Title 49 CFR Part 24. Relocation advisory services, moving costs reimbursement, replacement housing, and reimbursement for related expenses and rights of appeal are provided for in the Uniform Act.

If necessary, property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act and California Government Code Section 7267 et seq.

A.1.24 Code of Federal Regulations, Title 40, Part 131, Water Quality Standards

This regulation establishes requirements for water quality, including activities related to in-channel construction, dredging, and long-term effects resulting in sediment transport and scouring.

A.1.25 USACE Levee Safety Program

The USACE Rehabilitation and Inspection Program provides for rehabilitation and/or repair of Public Law 84-99 eligible (active status) levees that are damaged during flood events. This authority covers post flood repair of both Federally authorized and/or constructed and non-Federally constructed flood control works. Inspections of Federal levees are funded and conducted under the Inspection of Completed Works (ICW) program. Inspection of non-Federal levees are funded and conducted under the PL 84-99 Rehabilitation and Inspection Program. Because the subject levees in the proposed project area are classified as Federal levees, inspections are funded and conducted under the ICW program.

A.1.26 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) defines the ownership of Native American human remains and funerary materials excavated on lands owned or controlled by

the Federal government. This review of NAGPRA is provided because the FRWLP may traverse Federal lands. NAGPRA establishes a hierarchy of ownership as follows (25 USC 3002[a]).

- Where the lineal descendants can be found, the lineal descendants own the remains.
- Where the lineal descendants cannot be found, the remains belong to the Indian tribe or Native Hawaiian organization on whose land the remains were found.
- If the remains are discovered on other lands owned or controlled by the Federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe or Native Hawaiian organization that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.

Under NAGPRA, intentional excavation of Native American human remains on lands owned or controlled by the Federal government may occur (25 USC 3002[c]) only under the following circumstances.

- With a permit issued under the Archaeological Resources Protection Act (16 USC 470cc).
- After documented consultation with the relevant tribal or Native American groups.

NAGPRA also provides guidance on inadvertent discoveries of Native American or Hawaiian human remains on lands owned or controlled by the Federal government. When an inadvertent discovery on these lands occurs in association with construction, construction must cease. The party that discovers the remains must notify the relevant Federal agency, and the remains must be transferred according to the ownership provisions above (25 USC 3002[d]).

A.1.27 Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) requires a permit for intentional excavation of archaeological materials on Federal lands (16 USC 470ee[a]). This review of ARPA is provided because the FRWLP may traverse Federal lands. The Federal agency that owns or controls the land may dispense permits for excavation as provided in the ARPA regulations (43 CFR Section 7.5). The permit may require notice to affected Indian tribes (43 CFR Section 7.7), and compliance with the terms and conditions provided in the ARPA regulations (43 CFR Section 7.9).

A.1.28 Executive Order 13112: Prevention and Control of Invasive Species

EO 13112, signed February 3, 1999, directs all Federal agencies to prevent and control the introduction of invasive species in a cost-effective and environmentally sound manner. The EO established the National Invasive Species Council (NISC), which is composed of Federal agencies and departments, and a supporting Invasive Species Advisory Committee composed of state, local, and private entities. In 2008, the NISC released an updated national invasive species management plan that recommends objectives and measures to implement the EO and prevent the introduction and spread of invasive species (National Invasive Species Council 2008). The EO requires consideration of invasive species in NEPA analyses, including their identification and distribution, their potential effects, and measures to prevent or eradicate them.

A.1.29 Engineer Technical Letter (ETL) 1110-2-571 10 April 2009

In 2009, USACE published new Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures for the control of vegetation on levees (ETL 1110-2-571 10 April 2009). These guidelines recommend that a vegetation-free zone be established.

The vegetation-free zone is a three-dimensional corridor surrounding all levees, floodwalls, embankment dams, and critical appurtenant structures in all flood damage reduction systems. The vegetation-free zone applies to all vegetation except perennial, non-irrigated grass. Grass species are permitted. The only grasses permitted are perennial grasses whose primary function is to reliably protect against erosion. The species selected for the project shall be appropriate to local climate, conditions, and surrounding or adjacent land uses. Preference should be given to native species.

The primary purpose of a vegetation-free zone is to provide a reliable corridor of access to, or along, levees, floodwalls, embankment dams, and appurtenant structures. This corridor must be free of obstructions to assure adequate access by personnel and equipment for surveillance, inspection, maintenance, monitoring, and flood-fighting. In the case of flood-fighting, this access corridor must also provide the unobstructed space needed for the construction of temporary flood-control structures. Access is typically by four-wheel-drive vehicle, but for some purposes, such as maintenance and flood-fighting, access is required for larger equipment, such as tractors, bulldozers, dump trucks and helicopters. Accessibility is essential to the reliability of flood damage reduction systems.

The vegetation-free zone must be wide enough and tall enough to accommodate all likely access requirements. The minimum width of the corridor shall be the width of the levee, floodwall, or embankment dam, including all critical appurtenant structures, plus 15 feet on each side, measured from the outer edge of the outermost critical structure. In the case of a landside planting berm, the 15 feet is measured from the point at which the top surface of the planting berm meets the levee section. The minimum height of the corridor shall be 8 feet from any point on the ground.

No vegetation, other than approved grasses, may penetrate the vegetation-free zone, with two exceptions.

- Tree trunks are measured to their centerline, so one half of the tree trunk may be within the vegetation-free zone.
- Newly planted trees, whose crowns can be expected to grow, or be pruned, clear of the vegetation free zone within 10 years may be within the vegetation-free zone. (U.S. Army Corps of Engineers 2009.)

A.1.30 Federal - Massachusetts et al. v. U.S. Environmental Protection Agency (2007)

Twelve U.S. states and cities, including California, in conjunction with several environmental organizations, sued to force EPA to regulate greenhouse gases (GHGs) as a pollutant pursuant to the CAA in *Massachusetts et al. v. Environmental Protection Agency 549 US 497* (2007). The court ruled

that the plaintiffs had standing to sue, GHGs fit within the CAA's definition of a pollutant, and EPA's reasons for not regulating GHGs were insufficiently grounded in the CAA.

A.1.31 Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 mandates a host of actions that would aid in the reduction of GHG emissions. These actions include (but are not limited to): fuel economy standard of 35 miles per gallon (mpg) by 2020; improved energy efficiency in lighting and appliances; and investments in efficiency and renewable energy use.

A.1.32 Update to Corporate Average Fuel Economy Standards (2009)

The new Corporate Average Fuel Economy (CAFE) standards incorporate stricter fuel economy standards promulgated by the State of California into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25% by 2016. Rule-making to adopt these new standards is in process, and thus they are not yet in effect. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program also to be deemed in compliance with state requirements (U.S. Environmental Protection Agency 2010a).

A.1.33 EPA Rule: Mandatory Reporting of Greenhouse Gases (2009)

Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons (MT) or more per year of GHGs are required to report annual emissions to the EPA. The first annual reports for the largest emitting facilities, covering calendar year 2010, would be submitted to the EPA in 2011. The mandatory reporting rule does not limit GHG emissions but establishes a standard framework for emissions reporting and tracking of large emitters (U.S. Environmental Protection Agency 2010a).

A.1.34 EPA Endangerment Finding and Cause or Contribute Finding (2009)

In its Endangerment Finding, the Administrator of the EPA found, as described above, that GHGs in the atmosphere threaten the public health and welfare of current and future generations. The Administrator also found that the combined emissions of well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare. Although the Finding of Endangerment does not place requirements on industry, it is an important step in the EPA's process to develop regulation. This action is a prerequisite to finalizing the EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by EPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009 (U.S. Environmental Protection Agency 2010a).

In its Cause or Contribute Finding the Administrator found that the combined emissions of well-mixed GHG from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare (U.S. Environmental Protection Agency 2010a).

A.1.35 National Global Change Research Plan, 2012–2021 (Published in 2012)

In 2012 the National Science and Technology Council published the most recent update to the *National Global Change Research Plan, 2012-2021* (National Science and Technology Council, 2012). The National Science and Technology Council represents 13 Federal agencies which are responsible for developing policies and procedures to research, track and mitigate global change, including sealevel rise, ocean acidification, heat waves and drought, severe storms, floods, and forest fires that pose an ever-growing risk to life, property and agriculture. The Research Plan presented four major goals: Advance Scientific Knowledge; Inform Decisions; Conduct Sustained Assessments; and Communicate and Educate.

A.1.36 Federal Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, EPA established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy-duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the emission standards.

A.2 State Plans, Policies, and Regulations

A.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. The environmental review required imposes both procedural and substantive requirements. At a minimum, an initial review of the project and its environmental effects must be conducted. CEQA's primary objectives are listed below.

- Disclose to decision makers and the public the significant environmental effects of proposed activities.
- Identify ways to avoid or reduce environmental damage.
- Prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures.
- Disclose to the public reasons for agency approval of projects with significant environmental effects.
- Foster interagency coordination in the review of projects.
- Enhance public participation in the planning process.

CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. The act requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate public notices (including notices of preparation), scoping documents, alternatives, environmental documents (including mitigation measures, mitigation monitoring plans, responses to comments, findings, and statements

of overriding considerations), completion of agency consultation and State Clearinghouse review, and provisions for legal enforcement and citizen access to the courts.

CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that would cause one or more significant effects on the environment that cannot be mitigated. CEQA establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the State CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law.

This document is the instrument for CEQA compliance, as described in Chapter 1, *Introduction*.

Cultural Resources Protection under CEQA

CEQA requires the lead agency to consider the effects of a project on cultural resources. Two categories of cultural resources are specifically called out in the State CEQA Guidelines: historical resources (State CEQA Guidelines Section 15064.5[b]) and unique archaeological sites (State CEQA Guidelines 15064.5[c] and PRC Section 21083.2). Different legal rules apply to the two different categories of cultural resources, although the two categories sometimes overlap where a "unique archaeological resource" also qualifies as a "historical resource." In such an instance, the more stringent rules for archaeological resources that are historical resources apply, as explained below. CEQA and other California laws also set forth special rules for dealing with human remains that might be encountered during construction.

Historical resources are those meeting any of the requirements listed below.

- Resources listed in or determined eligible for listing in the California Register of Historical Resources (CRHR) (State CEQA Guidelines Section 15064.5[a][1]).
- Resources included in a local register as defined in California PRC Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant" (State CEQA Guidelines Section 15064.5[a][2]).
- Resources that are identified as significant in surveys that meet the standards provided in California PRC Section 5024.1[g] (State CEQA Guidelines Section 15064.5[a][3]).
- Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines Section 15064.5[a][3]).

Cultural resources may be listed in the CRHR if they have significance and integrity. Cultural resources are significant if they meet any of the following criteria.

- Resources that are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage, or the United States (California Code of Regulations [CCR], Title 14, Section 4852[b][1]).
- Resources that are associated with the lives of persons important in our past (14 CCR 4852[b][2]).

- Resources that embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values (14 CCR 4852[b][3]).
- Resources that yield, or may be likely to yield, information important in prehistory or history (14 CCR 4852[b][4]).

Integrity for built environment resources means the "survival of characteristics that existed during the resource's period of significance" (14 California Code of Regulations Section 4852[c]). Integrity must also be assessed in relationship to the particular criterion under which a resource has significance. For example, even where a resource has "lost its historic character or appearance [it] may still have sufficient integrity for the California Register if it maintains the potential to yield significant scientific or historical information or specific data" (14 California Code of Regulations Section 4852[c]). Integrity is further defined as the ability to "convey the reasons" for the significance of the resource (14 California Code of Regulations Section 4852[c]).

For archaeological sites, this language therefore means that a site must have a likelihood of yielding useful information for research in order to have integrity, if the site is significant for its data potential.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources, or identified in a historical resource survey does not preclude a lead agency under CEQA from determining that the resource *may* be a historical resource as defined in California PRC Section 5020.1(j) or 5024.1 (State CEQA Guidelines Section 15064.5[a][4]).

A project that causes a substantial adverse change in the significance of a historical resource is a project that may cause a significant impact under CEQA (State CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired. The significance of a historical resource is materially impaired if the project demolishes or materially alters any qualities:

- that justify the inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]); or
- that justify the inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]).

Unique archaeological resources, on the other hand, are defined in California PRC Section 21083.2 as a resource that meets at least one of the following criteria.

- The resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- The resource has a special and particular quality such as being the oldest of its type or the best available example of its type.
- The resource is directly associated with a scientifically recognized important prehistoric or historic event or person. (California PRC Section 21083.2[g])

Mitigation Requirements for Archaeological Resources Qualifying As Historical Resources

As set forth in State CEQA Guidelines Section 15064.5[c], special rules apply where a lead agency is not certain at first whether an archaeological resource qualifies as either a "historical resource" or a "unique archaeological resource." That section provides that "[w]hen a project will impact an archaeological site, a lead agency shall first determine whether the site is a historical resource." "If a lead agency determines that the archaeological site is a historical resource," the resource will be subject to the rules set forth above regarding historical resources. In addition, according to State CEQA Guidelines Section 15126.4[b]:

[p]ublic agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The following factors shall be considered and discussed in an EIR for a project involving such an archaeological site:

- (A) Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.
- (B) Preservation in place may be accomplished by, but is not limited to, the following:
 - 1. Planning construction to avoid archaeological sites;
 - 2. Incorporation of sites within parks, greenspace, or other open space;
 - 3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.
 - 4. Deeding the site into a permanent conservation easement.

Thus, although California PRC Section 21083.2, in dealing with "unique archaeological sites," provides for specific mitigation options "in no order of preference," CEQA Guidelines Section 15126.4(b), in dealing with "historical resources of an archaeological nature," provides that "preservation in place is the preferred manner of mitigating impacts to archaeological sites."

For archaeological resources that qualify as historical resources, "data recovery" is a disfavored form of mitigation compared with "preservation in place." Yet "[w]hen data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, would be prepared and adopted prior to any excavation being undertaken. Such studies would be deposited with the California Historical Resources Regional Information Center." Moreover, "[i]f an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation" (State CEQA Guidelines Section 15126.4[b][3][C]). "Data recovery shall not be required [, however,] for a historical resource [as with a unique archaeological resource] if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center" (State CEQA Guidelines Section 15126.4[b][3][D]).

With respect to *both* historical resources and unique archaeological resources:

a lead agency should make provisions for...resources accidentally discovered during construction. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be a historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate

mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place (State CEQA Guidelines Section 15064.5[f]).

Mitigation for Unique Archaeological Resources

If a lead agency determines that "an archaeological site does *not* meet the criteria" for qualifying as a historical resource "but does meet the definition of a unique archeological resource..., the site shall be treated in accordance with the provisions of section 21083.2" (described above). Section 21083.2 contains the special rules for mitigation for "unique archaeological resources." These rules do not apply if the archaeological resource is a historical resource (State CEQA Guidelines Section 15064.5[c][1]). The CEQA Statute states:

[i]f it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Examples of that treatment, in no order of preference, may include, but are not limited to, any of the following:

- 1. Planning construction to avoid archaeological sites.
- 2. Deeding archaeological sites into permanent conservation easements.
- 3. Capping or covering archaeological sites with a layer of soil before building on the sites.
- 4. Planning parks, greenspace, or other open space to incorporate archaeological sites.

Excavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archaeological resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report (California Public Resources Code Section 21083.2[d]).

If, however, "an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process" (State CEQA Guidelines Section 15064.5[c][4]).

Discoveries of Human Remains under CEOA

California law sets forth special rules that apply where *human remains* are encountered during project construction. These rules are set forth in State CEQA Guidelines Section 15064.5[e] as follows:

In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:

- (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
 - (A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required (as required under California Health and Safety Code Section 7050.5).
 - (B) If the coroner determines the remains to be Native American:
 - The coroner shall contact the Native American Heritage Commission within 24 hours.

- 2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
- The most likely descendent may make recommendations to the landowner or the
 person responsible for the excavation work, for means of treating or disposing of,
 with appropriate dignity, the human remains and any associated grave goods (as
 provided in Public Resources Code Section 5097.98), or
- (2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
 - (A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
 - (B) The descendant identified fails to make a recommendation; or
 - (C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

A.2.2 California Register of Historical Resources

The CRHR includes resources that are listed in or formally determined eligible for listing in the NRHP (see Section 3.17, *Cultural Resources*) as well as some California State Landmarks and Points of Historical Interest (PRC Section 5024.1, 14, CCR Section 4850). Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (State CEQA Guidelines Section 15064.5[a][2]). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. A cultural resource may be eligible for listing in the CRHR if it:

- 1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- 2. is associated with the lives of person important in our past;
- 3. embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important individual, or possesses high artistic values; or
- 4. has yielded, or may be likely to yield, information important in prehistory or history.

A.2.3 Native American Heritage Commission

The Native American Heritage Commission (NAHC) identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, and performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items. Consultation with NAHC and the Sacred Lands database was negative for findings in the affected area.

A.2.4 California Native American Graves Protection and Repatriation Act

Sections 8010–8011 of the California Health and Safety Code establish a state repatriation policy that is consistent with and facilitates implementation of NAGPRA. The policy requires that all California Indian human remains and cultural items be treated with dignity and respect, and encourages voluntary disclosure and return of remains and cultural items by publicly funded agencies and museums in California. The policy provides for mechanisms to aid California Indian tribes, including non–Federally recognized tribes, in filing repatriation claims and getting responses to those claims.

A.2.5 California Endangered Species Act

CESA is similar to ESA but pertains only to state-listed endangered and threatened species. CESA requires state agencies to consult with the California Department of Fish and Game (DFG) when preparing documents under CEQA to ensure that the actions of the state lead agency do not jeopardize the continued existence of listed species. CESA directs agencies to consult with DFG on projects or actions that could affect listed species, directs DFG to determine whether there would be jeopardy to listed species, and allows DFG to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. Agencies can approve a project that affects a listed species if the agency determines that there are "overriding considerations;" however, the agencies are prohibited from approving projects that would cause the extinction of a listed species.

Mitigating impacts on state-listed species involves avoidance, minimization, and compensation (listed in order of preference). Unavoidable effects on state-listed species are typically addressed in a detailed mitigation plan prepared in accordance with DFG guidelines. DFG exercises authority over mitigation projects involving state-listed species, including those resulting from CEQA mitigation requirements.

CESA prohibits the "take" of plant and wildlife species state-listed as endangered or threatened. DFG may authorize take if there is an approved habitat management plan or management agreement that avoids or compensates for effects on listed species.

Effects on wildlife resources are discussed in Section 3.9, Wildlife.

A.2.6 California Fish and Game Code

Protection of Fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. DFG has informed non-Federal agencies and private parties that their actions must avoid take of any fully protected species.

Section 1600

DFG regulates work that would substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600 to 1607. Any action from a public project that substantially diverts or obstructs the natural flow or changes the bed, channel, or bank of any river, stream, or lake, or uses material from a streambed must be previously authorized by

DFG in a lake or streambed alteration agreement under Section 1602 of the Fish and Game Code. This requirement may in some cases apply to any work undertaken within the 100-year floodplain of a body of water or its tributaries, including intermittent streams and desert washes. As a general rule, however, it applies to any work done within the annual high-water mark of a wash, stream, or lake that contains or once contained fish and wildlife, or that supports or once supported riparian vegetation.

Applications for a Streambed Alteration Agreement would be submitted to DFG to authorize the project under Section 1602.

Section 2800/Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act (NCCPA) (California Fish and Game Code Section 2800 et seq.) was enacted to support broad-based planning for effective protection and conservation of the state's wildlife heritage, while continuing to allow appropriate development and growth. The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by DFG that are necessary to maintain the continued viability of biological communities affected by human changes to the landscape. A Natural Community Conservation Plan identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land. DFG may authorize the take of any identified species, including listed and non-special-status species, pursuant to Section 2835 of the NCCPA, if the conservation and management of such species is provided for in a Natural Community Conservation Plan (NCCP) approved by DFG.

The project would not affect the take of state-listed species or substantially degrade habitat, so a Natural Community Conservation Plan is not triggered. Effects on biological resources are discussed in Section 3.8, *Vegetation*, and Section 3.9, *Wildlife*.

Section 3503 and 3503.5

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes*), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

A.2.7 Porter-Cologne Water Quality Control Act of 1969

In 1967, the Porter-Cologne Act established the State Water Board and nine RWQCBs as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and waste discharge requirements (WDRs) to be implemented by the State Water Board and nine RWQCBs. The State Water Board also establishes Basin Plans and statewide plans. The RWQCBs carry out State Water Board policies and procedures throughout the state.

Pursuant to the Porter-Cologne Act, the Central Valley RWQCB prepares and updates the Basin Plan for the Sacramento and San Joaquin River Basins every 3 years. The Basin Plan describes the

officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses. The planning area is located within the Central Valley RWOCB jurisdiction and is subject to the Basin Plan.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature, dissolved oxygen (DO, turbidity, and pH; total dissolved solids, electrical conductivity, bacterial content, and various specific ions; trace metals; and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oil and grease, color, taste, odor, and aquatic toxicity. Narrative objectives are often precursors to numeric objectives. The primary method used by the Central Valley RWQCB to ensure conformance with the Basin Plan's water quality objectives and implementation policies and procedures is to issue WDRs for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses. The project has the potential to affect water quality in surface water or groundwater within the project area which is governed by the Central Valley RWQCB.

Section 3.2, *Water Quality and Groundwater Resources*, describes water quality effects and mitigation measures for the project.

Central Valley Regional Water Quality Control Board

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of water quality control plans (basin plans) for each region. The Central Valley RWQCB is responsible for implementing its Basin Plan (Central Valley Regional Water Quality Control Board 2009) for the Feather River and its tributaries. The basin plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the basin plan for several key water quality constituents, including DO, water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

Basin plans are implemented primarily by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met (see discussion of the NPDES system under CWA above). Basin plans are supposed to be updated every 3 years and provide the technical basis for determining WDRs and taking enforcement actions. The Central Valley RWQCB Basin Plan was last updated in 2007. Another method the Central Valley RWQCB uses to implement the basin plan criteria is by issuing WDRs. WDRs are issued to any entity that discharges to a surface water body and does not meet certain water quality criteria such as those related to sediment. The WDR/NPDES permit also serves as a Federally required NPDES permit (under the CWA) and incorporates the requirements of other applicable regulations.

State Implementation Plan

In 1994, the State Water Board and EPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, the State Water Board adopted a SIP for priority toxic pollutant water quality criteria contained in the California Toxics Rule (CTR). The EPA promulgated the CTR in May 2000. The SIP also

implements National Toxics Rule (NTR) criteria and applicable priority pollutant objectives in the basin plans. In combination, the CTR and NTR and applicable basin plan objectives, existing RWQCB beneficial use designations, and SIP compose water quality standards and implementation procedures for priority toxic pollutants in non-ocean surface waters in California, such as the Feather River.

The CTR was promulgated in 2000 in response to requirements of the EPA NTR. The NTR and CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are subject to regulation pursuant to Section 303(c) of the CWA. The NTR and CTR include criteria for the protection of aquatic life and human health. Human health criteria (water and organisms) apply to all waters with a Municipal and Domestic Supply beneficial use designation as indicated in the RWQCBs' basin plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan, was adopted by the State Water Board in 2000 to establish provisions for translating CTR criteria, NTR criteria, and basin plan water quality objectives for toxic pollutants into the following.

- NPDES permit effluent limits
- Compliance determinations
- Monitoring for dioxin (2,3,7,8-TCDD) equivalents
- Chronic toxicity control provisions
- Initiating site-specific objective development
- Granting exceptions.

See Section 3.2, Water Quality and Groundwater Resources, for information related to the project.

A.2.8 California Code of Regulations, Title 23

The Central Valley Flood Protection Board (CVFPB) (formerly the California Reclamation Board) of the State of California regulates the modification and construction of levees and floodways in the Central Valley defined as part of the Sacramento Valley and San Joaquin Valley flood control projects. Rules promulgated in Title 23 of the California Code of Regulations (CCR) (Title 23, Division 1, Article 8 [Section 111 through 137]) regulate the modification and construction of levees to ensure public safety. The CVFPB requires an encroachment permit for any non-Federal activity along or near Federal flood damage reduction project levees and floodways or in CVFPB-designated floodways to ensure that proposed local actions or projects do not impair the integrity of existing flood damage reduction systems to withstand flood conditions. The permits are conditioned upon SBFCA's receipt of permission from USACE for alteration of the Federal project works pursuant to Section 408. The rules further state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the proposed project area levees.

The following CVFPB guidance applies:

The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the California Code of Regulations (CCR), and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in accordance with the USACE's

Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary federal standard applicable to this project, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

A.2.9 Central Valley Flood Control Act of 2008

The Central Valley Flood Control Act of 2008, passed in 2007, recognizes that the Central Valley of California, which includes the planning area, is experiencing unprecedented development, resulting in the conversion of historically agricultural lands and communities to densely populated residential and urban centers. Because of the potentially catastrophic consequences of flooding, the Act recognizes that the Federal government's current 100-year flood protection standard is not sufficient to protect urban and urbanizing areas within flood-prone areas throughout the Central Valley and declares that the minimum standard for these areas is a 200-year level of flood protection. To continue with urban development, cities and counties must develop and implement plans for achieving this new standard by 2025. With respect to flood risk reduction, the Central Valley Flood Control Act also calls upon the California Department of Water Resources (DWR) to develop a comprehensive Central Valley Flood Protection Plan (CVFPP) by the end of 2012 for protecting the lands currently within the Sacramento–San Joaquin River Flood Management System.

According to California Government Code Sections 65302.9 and 65860.1, every jurisdiction located within the Sacramento–San Joaquin Valley is required to update its General Plan and Zoning Ordinance in a manner consistent with the CVFPP within 24 months after the CVFPP's adoption, which occurred July 1, 2012. In addition, the locations of the state and local flood management facilities, locations of flood hazard zones, and the properties located in these areas must be mapped and consistent with the CVFPP.

The proposed project is intended to be consistent with the CVFPP, as the State seeks to continue to work with SBFCA to develop and implement projects to achieve an urban level of flood protection for Yuba City and other population centers in the affected area. This includes reconstructing and/or improving levees to urban design criteria (see below) along the west bank of the Feather River, adjacent to and upstream from Yuba City, as part of the FRWLP.

Senate Bill 5, Senate Bill 17, and Assembly Bill 162

According to legislation as part of Senate Bill (SB) 5 (Machado and Wolk), SB 17 (Florez) and Assembly Bill (AB) 162 (Wolk), urban and urbanizing areas in the Sacramento Valley and San Joaquin Valley will be required to achieve, or make adequate progress toward achieving, 200-year protection by the year 2015 to continue to have development approved in the floodplain. Specifically, AB 162 requires that each local jurisdiction's Safety Element include 200-year floodplain maps. Maps must be based on the best available data on flood protection, including areas protected by state and Federal project levees, and areas outside of these areas.

California Department of Water Resources Urban Levee Design Criteria

Pursuant to SB 5 (Government Code (GC) §65007(l)), the Urban Levee Design Criteria (ULDC) define the urban level of flood protection as the level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, DWR. While cities and counties located outside of the Sacramento–San Joaquin Valley are not required to make findings related to the urban level of flood protection, the ULDC can help inform

engineering and local land use decisions for areas at risk of flooding anywhere in California. The ULDC was developed through a collaborative process with stakeholders from local government (including representatives from the Central Valley, San Francisco Bay Area, and Los Angeles Region), State government, and the Federal government.

The ULDC provide criteria and guidance for design, construction, operation, and maintenance of levees and floodwalls in urban and urbanizing areas. When finalized, the ULDC will supersede Version 4 of the Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley (Version 4), dated December 15, 2010. The ULDC contain numerous revisions and refinements from Version 4.

A.2.10 California Surface Mining and Reclamation Act

The principal legislation addressing mineral resources in California is the Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710–2719), which was enacted in response to land use conflicts between urban growth and essential mineral production. The stated purpose of SMARA is to provide a comprehensive surface mining and reclamation policy that would encourage the production and conservation of mineral resources while ensuring that adverse environmental effects of mining are prevented or minimized; that mined lands are reclaimed and residual hazards to public health and safety are eliminated; and that consideration is given to recreation, watershed, wildlife, aesthetic, and other related values. SMARA governs the use and conservation of a wide variety of mineral resources, although some resources and activities are exempt from its provisions, including excavation and grading conducted for farming, construction, or recovery from flooding or other natural disaster.

Activities subject to SMARA include, but are not limited to, mining of minerals, gravel, and borrow material. The SMARA statute requires mitigation to reduce adverse effects on public health, property, and the environment. Because the Sacramento Area Flood Control Agency (SAFCA) would require borrow material for project construction, SAFCA must comply with SMARA. SMARA applies to an individual or entity that would disturb more than 1 acre or remove more than 1,000 cubic yards of material through surface mining activities, including the excavation of borrow pits for soil material. SMARA is implemented through ordinances for permitting developed by local government "lead agencies" that provide the regulatory framework under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA.

SMARA provides for the evaluation of an area's mineral resources using a system of Mineral Resource Zone (MRZ) classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, and mine data; and socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- MRZ-1—areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- MRZ-2—areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

- MRZ-3—areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- MRZ-4—areas where available information is inadequate for assignment into any other MRZ.

Although the state of California is responsible for identifying areas containing mineral resources, the county or city is responsible for SMARA implementation and enforcement by providing annual mining inspection reports and coordinating with CGS.

Mining activities that disturb more than 1 acre or 1,000 cubic yards of material require a SMARA permit from the lead agency, which is the county, city, or board that is responsible for ensuring that adverse environmental effects of mining are prevented or minimized. The lead agency establishes its own local regulations and requires a mining applicant to obtain a surface mining permit, submit a reclamation plan, and provide financial assurances, pursuant to SMARA.

Certain mining activities do not require a permit, such as excavation related to farming, grading related to restoring the site of a natural disaster, and grading related to construction. The project is under evaluation for SMARA applicability.

A.2.11 California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The California Department of Conservation, Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program. The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. Farmlands are divided into the following five categories based on their suitability for agriculture.

- Prime Farmland: land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed.
- Farmland of Statewide Importance: land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
- Unique Farmland: land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, but that has been used for the production of specific crops with high economic value.
- Farmland of Local Importance: land that is either currently producing crops or has the capability of production, but that does not meet the criteria of the categories above.
- Grazing Land: land on which the vegetation is suited to the grazing of livestock.

These categories are sometimes referred to as Important Farmland. Other categories used in the mapping system are urban and built-up lands, lands committed to non-agricultural use, and other lands (land that does not meet the criteria of any of the other categories).

Section 3.11, Agriculture, Land Use, and Socioeconomics, addresses effects on farmland.

A.2.12 California Land Conservation Act (Williamson Act)

The California Land Conservation Act of 1965, commonly known as the Williamson Act (California Government Code Section 51200 et seq.), enables local governments to enter into contracts with private landowners for the purpose of promoting the continued use of the relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish agricultural preserves consisting of lands devoted to agricultural uses and other compatible uses. Upon establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date upon which the contract is not renewed). In return, the landowner is guaranteed a relatively stable tax rate, based on the value of the land for agricultural/open space use only and unaffected by its development potential.

As a public agency that may acquire lands within agricultural preserves, including lands under contract, SBFCA is exempt from the normal cancellation process for Williamson Act contracts, because the contract is nullified for the portion of the land actually acquired (California Government Code Section 51295). SAFCA must provide notice to the California Department of Conservation prior to acquiring such lands (California Government Code Section 51291[b]). A second notice is required within 10 working days after the land is actually acquired (California Government Code Section 51291 (c J). As the land would be acquired for flood damage reduction measures, SAFCA is exempt from the findings required in California Government Code Section 51292 (California Government Code Section 51293[e][1]) because the proposed project consists of flood control works. The preliminary notice to the California Department of Conservation, provided before lands are actually acquired, would demonstrate the purpose of the project and the exemption from the findings.

Section 3.11, Agriculture, Land Use, and Socioeconomics, addresses effects on farmland.

A.2.13 California Climate Solutions Act

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction would be accomplished through an enforceable statewide cap on GHG emissions that would be phased in starting in 2012. To effectively implement the cap, AB 32 directs the California Air Resources Board (ARB) to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute

emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Contributions of GHG emissions related to the project are discussed in Section 3.6, *Climate Change and Greenhouse Gas*.

A.2.14 California Regulations for Environmental Justice

Most state governments have plans and policies intended to protect and expand the local and regional economies affecting the communities within their jurisdictions. State plans and policies also frequently address other social and economic impact topics, including fiscal conditions and related public services that affect local residents' quality of life.

Within California, SB 115 (Chapter 690, Statutes of 1999) was signed into law in 1999. The legislation established OPR as the coordinating agency for state environmental justice programs (California Government Code, Section 65040.12[a]) and defined environmental justice in statute as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12(e). SB 115 further required the California Environmental Protection Agency (Cal/EPA) to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (Public Resources Code, Sections 72000–72001).

In 2000, SB 89 (Chapter 728, Statutes of 2000) was signed, which complemented SB 115 by requiring the creation of an environmental justice working group and an advisory group to assist Cal/EPA in developing an intra-agency environmental justice strategy (PRC Sections 72002–72003). SB 828 (Chapter 765, Statutes of 2001) added and modified due dates for the development of Cal/EPA's intra-agency environmental justice strategy and required each board, department, and office within Cal/EPA to identify and address, no later than January 1,2004, any gaps in its existing programs, policies, and activities that may impede environmental justice (PRC, Sections 71114–71115).

Cal/EPA adopted its environmental justice policy in 2004 (California PRC, Sections 71110–71113). This policy (or strategy) provides guidance to its resource boards, departments, and offices. It is intended to help achieve the state's goal of "achieving fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

AB 1553 (Chapter 762, Statutes of 2001) required OPR to incorporate environmental justice considerations in the General Plan Guidelines. AB 1553 specified that the guidelines should propose methods for local governments to address the following goals.

- Plan for the equitable distribution of new public facilities and services that increase and enhance community quality of life.
- Provide for the location of industrial facilities and uses that pose a significant hazard to human health and safety in a manner that seeks to avoid over-concentrating these uses in proximity to schools or residential dwellings.

- Provide for the location of new schools and residential dwellings in a manner that avoids
 proximity to industrial facilities and uses that pose a significant hazard to human health and
 safety.
- Promote more livable communities by expanding opportunities for transit-oriented development.

Although environmental justice is not a mandatory topic in the general plan, OPR is required to provide guidance to cities and counties for integrating environmental justice into their general plans. The 2003 edition of the *General Plan Guidelines* included the contents required by AB 1553 (see pages 8, 12, 20–27, 40, 114, 142, 144, and 260 of the revised *General Plan Guidelines*).

Environmental justice issues pertaining to the project are discussed in Section 3.12, *Population, Housing, and Environmental Justice*.

A.2.15 Water Use Efficiency

The California Constitution prohibits the waste or unreasonable use of water. Further, Water Code Section 275 directs DWR and the State Water Board to "take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste or unreasonable use of water." Several legislative acts have been adopted to develop efficient use of water in the state.

- Urban Water Management Planning Act of 1985
- Water Conservation in Landscaping Act of 1992
- Agricultural Water Management Planning Act
- Agricultural Water Suppliers Efficient Management Practices Act of 1990
- Water Recycling Act of 1991
- Agricultural Water Conservation and Management Act of 1992

The purpose of the project is to address flood issues; it would not result in the waste or unreasonable use of water.

A.2.16 Public Trust Doctrine

When planning and allocating water resources, the State of California is required to consider the public trust and preserve for the public interest the uses protected by the trust. The public trust doctrine embodies the principle that certain resources, including water, belong to all and, thus, are held in trust by the state for future generations.

In common law, the public trust doctrine protects navigation, commerce, and fisheries uses in navigable waterways. However, the courts have expanded the doctrine's application to include protecting tideland, wildlife, recreation, and other public trust resources in their natural state for recreational, ecological, and habitat purposes as they affect birds and marine life in navigable waters. *The National Audubon Society v. Superior Court of Alpine County* (1983) 33 Cal 3d 419 decision extended the public trust doctrine's limitations on private rights to appropriative water rights, and also ruled that longstanding water rights could be subject to reconsideration and could possibly be curtailed. The doctrine, however, generally requires the court and the State Water Board

to perform a balancing test to weigh the potential value to society of a proposed or existing diversion against its effect on trust resources.

The 1986 Rancanelli decision applied the public trust doctrine to decisions by the State Water Board and held that this doctrine must be applied by the State Water Board in balancing all the competing interests in the uses of Bay-Delta waters (*United States v. State Water Resources Control Board* [1986] 182 Cal. App. 3d 82).

The project is consistent with the public trust doctrine, as the primary goals include improved flood protection.

A.2.17 Davis-Dolwig Act

The Davis-Dolwig Act declares that recreation and fish and wildlife enhancement are among the purposes of state water projects. It specifies that costs for recreation and fish and wildlife enhancement not be included in prices, rates, and charges for water and power to urban and agricultural users. Under the Davis-Dolwig Act, land for recreation and fish and wildlife enhancement must be planned and initiated at the same time as any other land acquisition for the project. Implementation of the project would maintain existing recreation areas and not preclude opportunities for future recreation use or facilities. While the project is not related to water supply, it consistent with this act.

A.2.18 Relocation Assistance and Property Acquisition

The State of California's Government Code Section 7260, et seq. brings the California Relocation Act into conformity with the Federal Uniform Act. In the acquisition of real property by a public agency, both the Federal and state acts seek to (1) ensure consistent and fair treatment of owners of real property, (2) encourage and expedite acquisition by agreement to avoid litigation and relieve congestion in the courts, and (3) promote confidence in public land acquisition.

The Relocation Assistance and Real Property Acquisition Guidelines were established by 25 CCR 1.6. The guidelines were developed to assist public entities with developing regulations and procedures implementing Title 42, Chapter 61 of the USC, the Uniform Act, for Federal and Federally-assisted programs. The guidelines are designed to ensure that uniform, fair, and equitable treatment is given to people displaced from their homes, businesses, or farms as a result of the actions of a public entity. Under the act, persons required to relocate temporarily are not considered displaced, but must be treated fairly. Such persons have a right to temporary housing that is decent, safe, and sanitary, and must be reimbursed for all reasonable out-of-pocket expenses. In accordance with these guidelines, people may not suffer disproportionate injury as a result of action taken for the benefit of the public as a whole. Additionally, public entities must ensure consistent and fair treatment of owners of such property, and encourage and expedite acquisitions by agreement with owners of displaced property to avoid litigation.

Property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act (see above) and California Government Code Section 7267 et seq.

A.2.19 Safe, Clean, Reliable Water Supply Act

This act declares that the basic goals of the state are, among other findings, to protect the integrity of the state's water supply system from catastrophic failure attributable to earthquakes and flooding.

A.2.20 Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 et seq.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as active, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered well-defined if its trace can be identified clearly by a trained geologist at the ground surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

The act directs California Geological Survey (CGS) to establish the regulatory zones, called AP Earthquake Fault Zones, around the known surface traces of active faults and to publish maps showing these zones. Each fault zone extends approximately 200 to 500 feet on each side of the mapped fault trace to account for potential branches of active faults.

CGS Special Publication 42 (Bryant and Hart 2007) states that in the absence of a site-specific faulting study, the areas within 50 feet of the mapped fault should be considered to have the potential for surface faulting and, therefore, no structure for human occupancy should be in these areas. Construction of buildings intended for human occupancy within the fault zone boundaries is strictly regulated, and site-specific faulting investigations are required.

Title 14 of CCR, Section 3601(e), defines buildings intended for human occupancy as those that would be inhabited for more than 2,000 hours per year. If no facilities are to be within AP Earthquake Fault Zones, this act would not apply.

A.2.21 Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: The state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards; and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

A.2.22 California Building Standards Code

California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (24 CCR). The CBSC provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the project would be required to comply with all provisions of the CBSC.

A.2.23 Assembly Bill 939, Titles 14, 17, and 27, Chapter 1095, Statutes of 1989

GHG emissions from landfills are regulated under AB 939, Titles 14 and 27. AB 939 mandated local jurisdictions to meet waste diversion goals of 25% by 1995 and 50% by 2000. In addition, AB 939 established an integrated statewide system for compliance and program implementation. Titles 14 and 27 contain detailed rules on daily operations, handling of specific waste types, monitoring, closure, and record-keeping.

At its June 25, 2009, public hearing, ARB approved for adoption CCR Title 17, article 4, sub-article 6, sections 95460 to 95476, Methane Emissions from Municipal Solid Waste Landfills. This regulation is a discrete early action GHG-reduction measure, as described in the California Global Warming Solutions Act of 2006 (AB 32; Stats. 2006, chapter 488). It would reduce methane emissions from landfills primarily by requiring owners and operators of certain uncontrolled landfills to install gas collection and control systems, and by requiring existing and newly installed gas collection and control systems to operate optimally.

A.2.24 Assembly Bill 1493—Pavley Rule (2002)

Known as Pavley I, AB 1493 standards are the nation's first GHG standards for automobiles. AB 1493 requires ARB to adopt vehicle standards that will lower GHG emissions from new light duty autos to the maximum extent feasible beginning in 2009. Additional strengthening of the Pavley standards (Pavley II) has been proposed for vehicle model years 2017–2020. Together, the two standards are expected to increase average fuel economy to roughly 43 mpg by 2020 and reduce GHG emissions from the transportation sector in California by approximately 14%. In June 2009, the EPA granted California's waiver request, enabling the state to enforce its GHG emissions standards for new motor vehicles beginning with the current model year. The new Federal CAFE standards, described above, are the analogous national policy.

A.2.25 Executive Order S-03-05 (2005)

Executive Order S-03-05 established the following GHG emission reduction targets for California's state agencies:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

Executive orders are binding only on state agencies. Accordingly, Executive Order S-03-05 will guide state agencies' efforts to control and regulate GHG emissions but would have no direct binding effect on local efforts. The Secretary of the Cal/EPA is required to report to the Governor and state legislature biannually on the effects of climate change on California, mitigation and adaptation plans, and progress made toward reducing GHG emissions to meet the targets established in this executive order.

A.2.26 Senate Bill 97, Chapter 185 (2007)

SB 97 of 2007 requires that the State's OPR prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of GHG emissions or the effects of GHG emissions as required by CEQA. The Natural Resources Agency adopted Amendments to the State CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the State's Office of Administrative Law approved the amendments and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective March 18, 2010.

A.2.27 Executive Order S-01-07, Low Carbon Fuel Standard (2007)

Executive Order S-01-07 essentially mandates: (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020, and (2) that a low carbon fuel standard (LCFS) for transportation fuels be established in California. The executive order initiates a research and regulatory process at the ARB. Based on an implementation plan developed by the CEC, ARB will be responsible for implementing the LCFS.

A.2.28 California Air Resources Board Mandatory Greenhouse Gas Reporting Rule (Title 17) (2007)

In December of 2007, ARB approved a rule requiring mandatory reporting of GHG emissions from certain sources, pursuant to AB 32. Facilities subject to the mandatory reporting rule must report their emissions either annually for large facilities or triennially for smaller facilities starting from 2010. In general the rule applies to facilities emitting more than 25,000 MT of carbon dioxide equivalent (CO_2e) in any given calendar year and electricity generating facilities with a nameplate generating capacity greater than 1 megawatt (MW) and/or emitting more than 2,500 MT CO_2e per year. Additional requirements apply to cement plants and entities that buy and sell electricity in the state.

A.2.29 California Air Resources Board Local Government Operations Protocol (2008)

On September 25, 2008, the Local Government Operations Protocol (LGOP) was adopted by ARB. The protocol, prepared by ARB, California Climate Action Registry, International Council of Local

Environmental Initiatives (ICLEI), and The Climate Registry, provides methods and techniques for the preparation of GHG emission inventories for local government municipal operations. The adopted protocol does not recommended any particular measures for GHG reductions by local governments (California Air Resources Board 2010a).

A.2.30 Senate Bill 375—Sustainable Communities Strategy, Chapter 728 (2008)

SB 375 provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans (RTPs), developed by metropolitan planning organizations (MPOs), including the Sacramento Area Council of Governments (SACOG), to incorporate a "sustainable communities strategy" (SCS) in their Regional Transportation Plans. The goal of the SCS is to reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. On September 23, 2010, ARB adopted regional GHG reduction targets that will focus each SCS. The target for the Sacramento region specifies a 7% reduction in per capita emissions by 2020 and a 16% reduction by 2035. SACOG is in the process of developing its SCS, pursuant to the regional GHG target. Completion is expected in December 2011. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. However, those provisions would not become effective until an SCS is adopted.

A.2.31 Senate Bills 1078/107 and Executive Order S-14-08— Renewable Portfolio Standard (2008)

SBs 1078 and 107, California's Renewable Portfolio Standard (RPS), obligates investor-owned utilities (IOUs), energy service providers (ESPs), and Community Choice Aggregations (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The CPUC and CEC are jointly responsible for implementing the program. EO S-14-08 set forth a longer range target of procuring 33% of retail sales by 2020.

A.2.32 California Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24)(2008)

Energy Conservation Standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (24 CCR 6). Title 24 requires that building shells and building components be designed to conserve energy and the standards are updated periodically (roughly every 3 years) to allow consideration and incorporation of new energy efficiency technologies. This program has been partially responsible for keeping California's per capita energy use approximately constant over the past 30 years.

Title 24 standards were most recently updated on July 17, 2008. The new code, adopted by the California Building Standards Commission, represents the nation's first green building standards and went into effect on January 1, 2010. Part 11 of the code established voluntary actions (Tier 1 and 2), designed to achieve a higher level of efficiency and sustainability, including planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code

requirements), water conservation, material conservation, and internal air contaminants. The voluntary standards became mandatory on January 1, 2011.

A.2.33 California Cap-and-Trade (2010)

Pursuant to the directives of AB 32, ARB recently approved measures on December 16, 2010, to enact a GHG Cap-and-Trade program for the state of California. The California Cap-and-Trade program would create a CO_2 market system with a GHG emissions cap that will be decreased over time. Building on the data required by the 2007 California Mandatory GHG Reporting rule, only stationary sources that emit more than 25,000 MT of CO_2 e per year would be affected by the Cap-and-Trade program. These sources include mostly large operations such as power plants, refineries, cement plants, hydrogen production facilities, and other large, stationary sources. Official rulemaking associated with achieving this emissions cap was adopted by January 1, 2011, and the actual program is to commence in 2012.

A.2.34 Actions Taken by California Attorney General's Office

The California Attorney General (AG) has filed comment letters under CEQA about a number of proposed projects. The AG also has filed several complaints and obtained settlement agreements for CEQA documents covering general plans and individual programs that the AG found either failed to analyze GHG emissions or failed to provide adequate GHG mitigation. The AG's office prepared a report listing the measures that local agencies should consider under CEQA to offset or reduce global warming effects. The AG's office also has prepared a chart of modeling tools to estimate GHG emissions effects of projects and plans. Information on the AG's actions can be found on the California Department of Justice, Office of Attorney General web site (California Department of Justice 2008).

A.2.35 California Air Pollution Control Officers Association Guidance

The California Air Pollution Control Officers Association (CAPCOA) released a report in January 2008 that describes methods to estimate and mitigate GHG emissions from projects subject to CEQA. The CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The CAPCOA report, however, does not recommend any one threshold. The report is designed as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects subject to CEQA (California Air Pollution Control Officers Association 2008).

In 2010 CAPCOA prepared a supplemental guidance document entitled Quantifying Greenhouse Gas Mitigation Measures (California Air Pollution Control Officers Association 2010). The report is intended to provide a resource for applicants and planners who might be required to mitigate GHG emissions, and provides tools to quantify a wide range of potentially feasible GHG reduction measures. However, the document does not specify GHG significance thresholds, nor does it advocate any policy or specific set of GHG mitigation measures.

A.2.36 Executive Order S-13-08

Executive Order S-13-08, issued November 14, 2008, directs the California Natural Resources Agency, DWR, Office of Planning and Research, Energy Commission, State Water Resources Control Board, State Parks Department, and California's coastal management agencies to participate in a number of planning and research activities to advance California's ability to adapt to the impacts of climate change. The order specifically directs agencies to work with the National Academy of Sciences to initiate the first California Sea Level Rise Assessment and to review and update the assessment every 2 years after completion; to immediately assess the vulnerability of the California transportation system to sea level rise; and to develop a California Climate Change Adaptation Strategy.

A.2.37 Idling Limit Regulation

On June 15, 2008, ARB adopted a regulation for off-road diesel vehicles. The regulation is designed to reduce toxic air contaminants (TACs) from diesel-powered construction and mining vehicles operating in California. Fleet owners are subject to retrofit or accelerated replacement/repower requirements for which ARB must obtain authorization from EPA prior to enforcement.

The regulation also imposes idling limitations on owners, operators, and renters or lessees of off-road diesel vehicles. The idling limits became effective on June 15, 2008, and require an operator of applicable off-road vehicles (self-propelled, diesel-fueled vehicles of 25 horsepower and greater that were not designed for on-road driving) to limit idling to no more than 5 minutes. These requirements are specified in 13 CCR 2449(d)(3).

A.2.38 State Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, ARB established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the standards.

A.2.39 Carl Moyer Memorial Air Quality Attainment Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between ARB and the local air districts throughout the state. Locally, the air districts administer the Carl Moyer program. The purpose of the program is to reduce air pollution emissions from heavy-duty engines.

A.3 Local Plans, Policies, and Regulations

In addition to Federal and state regulatory requirements, the project may be subject to certain zoning or other ordinances and general plans of Butte and Sutter Counties and cities in the affected area. These are presented below by resource topic for convenience. For more discussion on local plans and requirements applicable to the project, refer to the Regulatory Setting part of the specific resource sections of interest within this document.

A.3.1 Flood Control and Geomorphology

A.3.1.1 Butte County

Butte County General Plan 2030

Both the Water Resources Element and the Health and Safety Element of the Butte County General Plan 2030 (Butte County 2010) contain goals and policies relevant to flood control. These goals and policies focus on minimizing risk and property damage from flooding, protection of surface water and groundwater resources and quality, and management of stormwater runoff.

- **Goal W-6** Improve streambank stability and protect riparian resources.
 - Policy W-P6.1 Any alteration of natural channels for flood control shall retain and protect riparian vegetation to the extent possible while still accomplishing the goal of providing flood control. Where removing existing riparian vegetation is unavoidable, the alteration shall allow for reestablishment of vegetation without compromising the floodflow capacity.
 - Policy W-P6.2 Where streambanks are already unstable, as demonstrated by erosion or landslides along banks, tree collapse, or severe in-channel sedimentation, proponents of new development projects shall prepare a hydraulic and/or geomorphic assessment of onsite and downstream drainageways that are affected by project area runoff.
- **Goal HS-2** Protect people and property from flood risk.
 - Policy HS-P2.1 The County supports the efforts of regional, State and federal agencies to improve flood management facilities along the Sacramento River while conserving the riparian habitat of the river.
 - **Policy HS-P2.2** The County supports the efforts of private landowners and public agencies to maintain existing flood management facilities.
 - Policy HS-P2.3 The County supports the Flood Mitigation Plan and the Flooding Mitigation Action Plan in the Butte County Multi-Jurisdictional All-Hazard Pre-Disaster Mitigation Plan (MHMP).
 - o **Policy HS-P2.4** Development projects on lands within the 100-year flood zone, as identified on the most current available maps from FEMA (the most current available map at the time of the publication of General Plan 2030 is shown on Figure HS-1), shall be allowed only if the applicant demonstrates that it will not:*
 - a. Create danger to life and property due to increased flood heights or velocities caused by excavation, fill, roads and intended use.
 - b. Create difficult emergency vehicle access in times of flood.
 - c. Create a safety hazard due to the height, velocity, duration, rate of rise and sediment transport of the flood waters expected at the site.
 - d. Create excessive costs in providing governmental services during and after flood conditions, including maintenance and repair of public facilities.
 - e. Interfere with the existing water conveyance capacity of the floodway.
 - f. Substantially increase erosion and/or sedimentation.

- g. Require significant storage of material or any substantial grading or substantial placement of fill that is not approved by the County through a development agreement, discretionary permit, or other discretionary entitlement; a ministerial permit that would result in the construction of a new residence; or a tentative map or parcel map.
- h. Conflict with the provisions of the applicable requirements of Government Code Sections 65865.5, 65962 or 66474.5.
- o **Policy HS-P2.5** The lowest floor of any new construction or substantial improvement within Flood Zones A, AE, AH and shaded Zone X, as shown in Figure HS-1 or the most current maps available from FEMA, shall be elevated 1 foot or more above the 100-year flood elevation. (County Flood Ordinance Sec. 26-22). Within urban or urbanizing areas, as defined in Government Code 65007, the lowest floor of any new construction or substantial improvements shall be elevated a minimum of 1 foot above the 200-year flood elevation.
- Policy HS-P2.6 After General Plan 2030 and the Zoning Ordinance are amended to be consistent with the Central Valley Flood Protection Plan, scheduled for adoption in July 2012, the County shall make specific findings prior to approval of a development agreement, subdivision or discretionary permit or other discretionary entitlement, or any ministerial permit that would result in the construction of a new residence. The County shall make findings that it has imposed conditions that will protect the property to the urban level of flood protection, as defined in Government Code Section 65007, in urban and urbanizing areas, or to the national Federal Emergency Management Agency standard of flood protection in nonurbanized areas.
- Goal HS-3 Prevent and reduce flooding.
 - o **Policy HS-P3.1** Watersheds shall be managed to minimize flooding by minimizing impermeable surfaces, retaining or detaining stormwater and controlling erosion.
 - Policy HS-P3.2 Applicants for new development projects shall provide plans detailing
 existing drainage conditions and specifying how runoff will be detained or retained on-site
 and/or conveyed to the nearest drainage facility and shall provide that there shall be no
 increase in the peak flow runoff to said channel or facility.
 - Policy HS-P3.3 All development projects shall include stormwater control measures and site design features that prevent any increase in the peak flow runoff to existing drainage facilities.
 - **Policy HS-P3.4** Developers shall pay their fair share for construction of off-site drainage improvements necessitated by their projects.
- Goal HS-4 Reduce risks from levee failure.
 - Policy HS-P4.1 The County supports the efforts of regional, State or federal agencies to study levee stability throughout the county, particularly levees that were designed and constructed to provide a minimum 100-year level of protection.
 - Policy HS-P4.2 The County supports the efforts of levee owners and regional, State, or federal agencies to design and reconstruct levees that do not meet flood protection standards (200-year for urban or urbanizing areas, 100-year for all other areas) to bring them into compliance with adopted State and/or federal standards.

 Policy HS-P4.3 New development proposals in levee inundation areas shall consider risk from failure of these levees.

County Ordinance

The delineation of flood boundaries and adoption of County ordinances regulating development within identified floodplains/floodways are the basic flood management tools that the County uses to identify flood hazards and implement its own flood management program. The Federal Emergency Management Agency's (FEMA's) flood mapping program is a critical component of these efforts. A County ordinance adopted in March 1983 enforced flood hazard prevention, as set forth in Article IV in Chapter 26 of the Butte County Code. The Code assigns authority for enforcement of County flood hazard prevention policy to the floodplain administrator, in this case the Director of Development Services. The Code relies on FEMA and Flood Insurance Studies (FIS) data, although other studies may supplement these data if the floodplain administrator recommends it and the Board of Supervisors approves it. The Flood Hazard Prevention Ordinance appoints the Department of Development Services to review all applications for new construction or subdivisions within flood hazard areas. The ordinance's basic requirement, in order to reduce flood hazards, is that the lowest floor of any new construction or substantial improvement within Flood Zones A, AE, AH, and shaded Zone X be elevated 1 foot or more above the regulatory flood elevation. Also, it must be shown that development within the floodplain will not raise the existing flood level. There are other criteria for building in flood hazard areas, including flood-proofing nonresidential structures and designing structures to withstand hydrostatic pressures and hydrodynamic loads.

In areas subject to flooding that are proposed for subdivision, the County is required to ensure that:

- All such proposed developments are consistent with the need to minimize flood damage,
- Subdivisions and parcel maps must, as a condition of approval, establish regulatory flood elevations and note same on final maps prior to recordation of the final map,
- Adequate drainage is provided to reduce exposure to flood hazards.
- All public utilities and facilities are located so as to minimize or eliminate flood damage.

Butte County Multi-Jurisdictional All-Hazard Pre-Disaster Mitigation Plan

The County's principal emergency response plan is the Butte County Multi-Jurisdictional All-Hazard Pre-Disaster Mitigation Plan (Butte County MHMP) (Butte County 2007), adopted in March 2007. The purpose of the plan is to meet the requirements of the Disaster Mitigation Act and thereby maintain continued eligibility for certain hazard mitigation (or disaster loss reduction) programs from FEMA. The plan lays out the strategy that will enable Butte County to become less vulnerable to future disaster losses. The plan reviews the County's capabilities with regard to reducing impacts of natural hazards (e.g., flooding, dam failure) and identifies recommended action items to reduce vulnerability to these hazards. The most relevant section of the plan with respect to flood control issues is the Flooding Mitigation Action Plan. The Flooding Mitigation Action Plan contains a description of flood hazards, a risk assessment, plans and programs to address the hazards, and mitigation goals and strategies for each jurisdiction in Butte County.

In essence, the main goal of the Butte County MHMP with respect to flood control is to protect infrastructure and agriculture from long-term risks of flood, and this goal is to be achieved by implementation of the Flooding Mitigation Action Plan.

Butte County Flood Mitigation Plan

The County established the Butte County Flood Mitigation Plan (Butte County FMP) (Wood Rodgers 2006) to provide guidance to agencies that protect life, property, and livestock; are involved in land use planning; administer FEMA's National Flood Insurance Program (NFIP); and respond to flood emergencies in Butte County. The Butte County FMP will need to be updated to address new state flood control regulations described above.

City of Biggs

Biggs does not have any FEMA-identified flood hazard areas. The elevation of the city from 96+ feet above sea level in the northeast to 86+ feet above sea level near its westerly boundary generally prevents water accumulation in depths that create dangerous flooding. However, the city of Biggs is subject to inundation if the Thermalito Afterbay levee or the Oroville Dam fails.

City of Biggs General Plan 1997–2015

Flood mitigation goals, policies, and programs described in the Public Health and Safety Element of the City of Biggs General Plan 1997–2015 (City of Biggs 1998) include the following.

- Goal 6.2 Minimize the risk of personal injury and property damage resulting from flooding.
 - Policy 6.2.A Develop flood control strategies and improvement plans for the City of Biggs in coordination with RD 833.
 - Policy 6.2.B New development shall not be approved in areas which are subject to flooding without prior review and approval of plans for improvements which provide a minimum flood protection level equal to the 100 year occurrence storm event.
 - Policy 6.2.C Development of structures must be in compliance with FEMA standards. All 100 year flood hazards must be completely mitigated through proper design.
 - o **Policy 6.2.D** All new residential development shall be constructed on pads which are at least six inches above the top of curb of the street on which the development fronts.
 - **Policy 6.2.E** New development projects shall be designed to avoid increases in peak storm runoff levels entering RD 833 channels.
 - Program 6.2.1 Encourage the California Department of Water Resources to determine the
 maximum flow capacity for the Feather River and to identify portions of the Feather River
 levees, particularly in the vicinity of Hazelbush Levee, which are subject to failure or
 overtopping during periods of high water flow.

Also see the discussion above for Butte County MHMP, which is applicable to flood control in the city of Biggs.

City of Gridley

Flooding is a hazard for Gridley, which is in the SBFCA assessment district. The city of Gridley is approximately 1.3 miles west of the 100-year floodplain (as mapped by FEMA) of the Feather River and the levees that exist there. When 200-year floodplain maps for the Gridley area become available from DWR, they must be analyzed to determine whether any areas planned for development under the General Plan are within the 200-year floodplain. If the possibility of flooding does exist from flood levels occurring at intervals of 200 years or less, such measures as necessary

must be taken to meet the state law requirements for development in Flood Hazard Zones. Gridley and likely evacuation routes (State Route [SR] 99, SR 70, and SR 162) are located in an area subject to inundation following partial or total failure of Oroville Dam.

City of Gridley 2030 General Plan

Flood hazard safety goals and policies described in the Safety Element of the City of Gridley 2030 General Plan (City of Gridley 2010) include the following.

- Safety Goal 2: To reduce risks to people and property from flooding.
 - Safety Policy 2.1 The City will use the best available flood hazard information and mapping from regional, state, and federal agencies and use this information to inform land use and public facilities investment decisions.
 - **Safety Policy 2.2** The City will regulate development within floodplains in accordance with state and federal requirements.
 - o **Safety Policy 2.3** New development shall provide an evaluation of potential flood hazards and demonstrate compliance with state and federal flood standards prior to approval.

Also see the discussion above for Butte County MHMP, which is applicable to flood control in the city of Gridley.

A.3.1.2 Sutter County

Sutter County General Plan

The Public Health and Safety Element of the Sutter County General Plan (Sutter County 2010) contains goals and policies relevant to flood control. These goals and policies focus on minimizing risk and property damage from flooding, protection of surface water and groundwater resources and quality, and stormwater runoff management. They also presently reflect the requirements established by SB 5 pertaining to planning and other efforts necessary ultimately to provide for 200-year flood protection.

- **Goal PHS 1** Minimize the potential for loss of life, personal injury and property damage associated with floods.
 - **PHS 1.1** NFIP. Continue to participate in the National Flood Insurance Program and the Community Rating System.
 - PHS 1.2 Minimize Risk of Flood Damage. Require a minimum of 100-year flood protection and regulate development in accordance with local, State, and federal requirements to avoid or minimize the risk of flood damage.
 - O PHS 1.3 Flood Protection for New Development. Require new development in urban and/or urbanizing areas to provide 200-year flood protection within three years of adoption of the Central Valley Flood Protection Plan in accordance with state regulations, and require new development outside urban or urbanizing areas to provide 100-year flood protection in accordance with Federal regulations.
 - o **PHS 1.4** Development in Dam Inundation Areas. Require new development located in dam inundation areas to consider the risks from dam failure.

- PHS 1.5 Essential Facilities. Require that new essential public facilities (e.g., hospitals, health care facilities, emergency shelters, fire stations, etc.) be located, when feasible, outside of flood hazard zones, as defined by FEMA, or designed to maintain the structural and operational integrity of the facility during flooding events.
- PHS 1.6 Inter-Agency Coordination. Coordinate efforts with local, regional, State, and federal agencies to maintain and improve the existing levee system to protect life and property.

County Ordinance

As a participant in the NFIP, Sutter County is required to adopt and enforce a floodplain management ordinance that minimizes future flood risks to new or existing construction. The Floodplain Management Ordinance (Chapter 1780 of the Sutter County Codes and Ordinances):

- Restricts land use in flood prone areas.
- Requires flood protection measures at the time of initial construction for uses that are vulnerable to floods.
- Controls the alteration of natural floodplains.
- Controls activities that may increase flood damage.
- Prevents or regulates unnatural diversions of floodwaters that could increase flood hazards in other areas.

The current Floodplain Management Ordinance was adopted in October 2008. The ordinance refers to the revised FIRMs dated December 2, 2008, and all subsequent amendments and/or revisions (1780-320). The ordinance will be amended, as necessary, to reflect minor changes (including referencing the revised FIRMs) sometime between the Letter of Final Determination (August 2011) and the effective date of the new FIRMs (February 2012).

Final Yuba City-Sutter County, California Multi-Hazard Mitigation Plan

The County's principal emergency response plan is the Final Yuba City–Sutter County, California Multi-Hazard Mitigation Plan (AMEC 2007), adopted in January 2008. The purpose of the plan is to meet the requirements of the Disaster Mitigation Act and thereby maintain continued eligibility for certain hazard mitigation (or disaster loss reduction) programs from FEMA. The plan lays out the strategy that will enable Sutter County to become less vulnerable to future disaster losses. The plan reviews the County's capabilities with regard to reducing effects of natural hazards (e.g., flooding, dam failure) and identifies recommended action items to reduce vulnerability to these hazards. The plan addresses the unincorporated county, as well as the cities of Yuba City and Live Oak, and six participating districts: the Gilsizer County Drainage District, Levee District 1, and RDs 1001, 1500, 70, and 1660.

The plan identifies the following goals and objectives related to flood hazard protection, but it does not contain any specific policies.

• **Goal 1:** Improve community awareness about hazards that threaten our communities and identify appropriate actions to minimize their impacts upon people and property.

- Objective 1.1: Increase public awareness about the nature and extent of hazards they are exposed to, where they occur, and recommend responses to identified hazards (create/continue an outreach program, provide educational resources and training)
- **Goal 2:** Minimize Risk and Vulnerability to Flood Hazards
 - Objective 2.1: Improve the integrity of the levees to at least 100-year flood protection
 - Objective 2.2: Eliminate open drainage ditches within 20' of traveled roadways within urbanized areas
 - **Objective 2.3:** Minimize damage/loss to roads
 - o **Objective 2.4:** Identify/Protect evacuation routes
 - Objective 2.5: Reduce localized flooding from storm events
 - Objective 2.6: Provide Protection for community critical facilities

City of Yuba City

Yuba City General Plan

The Noise and Safety Element of the Yuba City General Plan (City of Yuba City 2004) contains guiding policies and implementing policies relevant to flood control. These guiding and implementing policies focus on minimizing risk and property damage from flooding, protection of surface water and groundwater resources and quality, and management of stormwater runoff.

- **9.3-G-1** Protect the community from risks to lives and property posed by flooding and stormwater runoff.
- **9.3-G-2** Collect and dispose of storm water in a safe and efficient manner.
- 9.3-G-3 Ensure that dams and levees are properly maintained for long-term flood protection.
- **9.3-I-1** Implement the drainage improvements identified in the City's Capital Improvement Program.
- **9.3-I-2** Continue to work with the U.S. Army Corps of Engineers to implement levee improvements on the Feather River. Incorporate features in the levee system to ensure flood protection and at the same time improve the connection between the city and the river.
- 9.3-I-3 When necessary, require new development to prepare hydrologic studies to assess storm runoff impacts on the local and subregional storm drainage systems and, if warranted, require new development to provide adequate drainage facilities and to mitigate increases in storm water flows and/or volume to avoid cumulative increases in downstream flows.

Developers shall provide an assessment of a project's potential impacts on the local and subregional storm drainage systems, so that the City can determine appropriate mitigation to ensure that system capacity and peak flow restrictions are not exceeded.

- **9.3-I-4** Restrict new development in areas subject to 100 year flooding, as shown in Figure 9-6.
- **9.3-I-5** Provide information to property owners about the availability of flood insurance.

This policy can be implemented with counter handouts and stories in the City's newsletter and pages on the City's website.

• **9.3-I-6** As new development occurs, work with Sutter County to establish drainage areas that serve the entire Planning Area.

A new drainage study may be appropriate to determine the best means to establish drainage areas that would safely channel runoff and provide protection from flooding.

• 9.3-I-7 Utilize parks for the secondary purpose of storm water storage.

Final Yuba City-Sutter County, California Multi-Hazard Mitigation Plan

See the Final Yuba City–Sutter County, California Multi-Hazard Mitigation Plan (AMEC 2007) and discussion above under Sutter County for relevant goals adopted by Yuba City that apply to the proposed project area.

City of Live Oak

City of Live Oak 2030 General Plan

The Public Utilities, Services, and Facilities Element and the Public Safety Element of the City of Live Oak 2030 General Plan (City of Live Oak 2010) contain goals, policies, and implementation programs relevant to flood control. These goals, policies, and implementation programs focus on minimizing risk and property damage from flooding, protection of surface water and groundwater resources and quality, and stormwater runoff management.

Within the Public Utilities, Services, and Facilities Element, the following flood protection goal, policies, and implementation program are included.

- Goal PUBLIC-6. Protect property and public health through adequate flood protection.
 - Policy PUBLIC-6.1 The City will coordinate with ongoing regional efforts to verify and improve flood protection for the Planning Area, consistent with state and federal regulations.
 - o **Policy PUBLIC-6.2** The City will assess fees for new development on a fair-share basis to fund regional flood protection improvements needed to meet state and federal standards.
 - o **Policy PUBLIC-6.3** The City will proactively identify and take advantage of regional, state, and federal funding that may be available for use in flood protection improvements.
 - Implementation Program PUBLIC-6.1

The City will continue its participation with the regional flood protection joint powers authority addressing the assessment and improvement of levees on the west side of the Feather River to meet state and federal standards.

Within the Public Safety Element, the following flood protection goal, policies, and implementation programs are included.

- **Goal PS-2.** Minimize the loss of life and damage to property caused by flood events.
 - Policy PS-2.1 The City will coordinate with the Sutter Butte Flood Control Agency to ensure
 that flood control facilities protecting Live Oak's Planning Area from flood risks to the City
 are well maintained and capable of protecting existing and proposed structures from
 flooding, in accordance with state law.

- Policy PS-2.2 The City will regulate development within floodplains according to state and federal requirements to minimize human and environmental risks and maintain the City's eligibility under the National Flood Insurance Program.
- Policy PS-2.3 The City will require evaluation of potential flood hazards before approving development projects.
- Policy PS-2.4 The City will require applicants for development to submit drainage studies
 that adhere to City stormwater design requirements and incorporate measures from the
 City's master drainage plan to prevent on- or off-site flooding.
- Policy PS-2.5 New development shall be required to be consistent with regional flood control improvement efforts. New development shall contribute on a fair-share basis to regional solutions to improve flood protection to meet state and federal standards.
- Policy PS-2.6 The City will use the most current flood hazard and floodplain information from state and federal agencies (such as the State Department of Water Resources, the Federal Emergency Management Agency, and the Army Corps of Engineers) as a basis for project review and to guide development in accordance with federal and state regulations.
- Policy PS-2.7 As feasible, new development should incorporate stormwater treatment practices that allow percolation to the underlying aquifer and minimize off-site surface runoff (and therefore flooding).

• Implementation Program PS-1

The City will continue its participation with the regional flood protection joint powers authority addressing the assessment and improvement of levees on the west side of the Feather River to meet federal and state standards. The City will implement development impact fees to provide for necessary levee studies and improvement programs in coordination with the regional flood control joint powers authority. The City will proactively identify and take advantage of federal, state, and regional funding that may be available for use in flood protection improvements.

• Implementation Program PS-3

Consistent with state law, the City will consult with the Central Valley Flood Protection Board and local flood protection agencies serving the Planning Area, to obtain updated floodway and floodplain maps, data, and policies. When this information is available, if necessary, the City will update the General Plan and revise all applicable development standards, including the zoning code. Subdivision approvals, development agreements, permits, and other City entitlements will incorporate these revised City policies and regulations.

• Implementation Program PS-4

If necessary, the City will update the General Plan to incorporate 200-year floodplain mapping from the California Department of Water Resources and Central Valley Flood Protection Board, once available.

• Implementation Program PS-5

In review of new development projects, require disclosure of risk where proposed development would occur in flood risk areas. This disclosure may include notifying new residents in these areas and encouraging purchase of appropriate insurance.

A.3.2 Water Quality and Groundwater Resources

A.3.2.1 Butte County

Butte County 2030 General Plan

The Butte County General Plan 2030 was adopted in October 2010 and became effective on November 30, 2010 (Butte County 2010). The plan includes several goals and policies related to water resources. For example, the plan contains the following goal related to water quality.

• **Goal W-1** Maintain and enhance water quality.

The goal is followed by policies, such as integrating county planning and programs with other watershed planning efforts, including BMPs, guidelines, and policies of the Central Valley RWQCB, and identifying and eliminating or minimizing all sources of existing and potential point and non-point sources of pollution to ground and surface waters.

Butte County Stormwater Management Program

Butte County has been covered under an NPDES Phase II MS4 General Permit since 2004. Currently, Butte County's MS4 General Permit covers the urbanized unincorporated areas within and around the City of Chico. As part of permit compliance, the Butte County Department of Public Works implements a stormwater management plan (SWMP).

City of Biggs

City of Biggs General Plan 1997-2015

The City of Biggs is currently involved in the general plan update process. The existing City of Biggs General Plan 1997–2015 was adopted in January 1998 (City of Biggs 1998). This plan contains goals and policies related to water resources. For example, the Open Space and Conservation Element of the plan highlights the following goal related to water resources.

• **GOAL 5.4:** Protect the quantity and quality of community water supplies and avoid degradation of water quality downstream from Biggs.

City of Gridley

City of Gridley 2030 General Plan

The City of Gridley specifies water-related policies in various sections of the City of Gridley 2030 General Plan (City of Gridley 2010). These policies are primarily outlined in the Public Services and Facilities Element. For example, the plan includes the following water resources goal.

• Public Facilities Goal 1: To maintain safe and reliable ongoing water supply.

A.3.2.2 Sutter County

Sutter County General Plan—Public Draft

The county is in the process of updating its general plan that was adopted in 1996. The public draft (September 2010) is available on the County's website (Sutter County 2010). The draft general plan

contains a number of goals and related policies related to water resources. For example, the Environmental Resources Element includes the following goal.

• **Goal ER 6:** Preserve and protect the County's surface water and groundwater resources.

The goal is followed by several policies consistent with achieving this goal, such as integrated water management programs, surface water resource protection, groundwater protection and sustainability, and stormwater quality.

Yuba City-Sutter County Stormwater Management Program

Sutter County and the City of Yuba City are co-permittees of the NPDES Phase II MS4 General Permit, which requires the development of a SWMP. Adopted in 2003, the Yuba City-Sutter County SWMP is a combined effort of the city and county, which addresses stormwater discharges to the Sutter Bypass and the Feather River through pumping stations located along several levees. This SWMP describes the approach to reduce stormwater pollution. It includes the required six minimum control measures required under the NPDES Phase II MS4 program: public education and outreach; public participation/involvement; illicit discharge detection and elimination; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping (City of Yuba City and Sutter County 2003).

City of Yuba City

Yuba City General Plan

The City of Yuba City General Plan was updated in April 2004 (City of Yuba City 2004). The Environmental Conservation Section has numerous goals, or guiding policies, and implementing policies related to water quality. Guiding policies include protecting and enhancing surface water and groundwater resources and enhancing the natural condition of the Feather River waterway. Related implementing policies include complying with the Central Valley RWQCBs regulations and standards to maintain and improve the quality of both surface water and groundwater resources; continuing to control stormwater pollution and protect the quality of the city's waterways by preventing oil and sediment from entering the river; and requiring new construction to utilize BMPs such as site preparation, grading, and foundation designs for erosion control to prevent sediment runoff into waterways, specifically the Feather River.

City of Live Oak

City of Live Oak 2030 General Plan

The City of Live Oak 2030 General Plan was adopted in May 2010 (City of Live Oak 2010). The city's plan contains several water goals, policies, and implementation programs. For example, the Public Utilities, Services, and Facilities Element of the plan includes the following goal related to water resources.

• **Goal PUBLIC-1:** Provide a safe and reliable water supply and delivery system.

A.3.3 Geology, Soils, Seismicity, and Mineral Resources

A.3.3.1 Butte County

Butte County General Plan 2030

The Health and Safety Element of the Butte County General Plan 2030 (Butte County 2010) includes the following goals and policies related to geologic and seismic hazards.

- **Goal HS-6** Reduce risks from earthquakes.
 - Policy HS-P6.1 Appropriate detailed seismic investigations shall be completed for all public and private development projects in accordance with the Alquist-Priolo Earthquake Fault Zoning Act.*
 - Policy HS-P6.2 Geotechnical investigations shall be completed prior to approval of schools, hospitals, fire stations and sheriff stations, as a means to ensure that these critical facilities are constructed in a way that mitigates site-specific seismic hazards.
 - **Action HS-A6.1** Continue to require applicants to seismically retrofit existing homes where required under existing building codes.
- **Goal HS-7** Reduce risks from steep slopes and landslides.
 - Policy HS-P7.1 Site-specific geotechnical investigations shall be required to assess landslide potential for private development and public facilities projects in areas rated "Moderate to High" and "High" in Figure HS-4 or the most current available mapping.*
- Goal HS-8 Reduce risks from erosion.
 - Policy HS-P8.1 Site-specific geotechnical investigations shall be required to assess erosion potential for private development projects and public facilities in areas rated "Very High" in Figure HS-5 or the most current available mapping.*
- **Goal HS-9** Reduce risks from expansive soils.
 - Policy HS-P9.1 Site-specific geotechnical investigations shall be required to assess risks from expansive soils for private development projects and public facilities in areas rated "High" in Figure HS-6 or the most current available mapping.*
- **Goal HS-10** Avoid subsidence from groundwater withdrawal.
 - o **Policy HS-P10.1** Continue to work with water providers and regulatory agencies to ensure that groundwater withdrawals do not lead to subsidence problems.
 - Policy HS-P10.2 Existing programs to monitor potential subsidence activity shall be supported.

The Agriculture Element and Area and Neighborhood Plans Element of the plan include the following goal, policies, and objectives related to soils.

- **Goal AG-1** Maintain, promote and enhance Butte County's agriculture uses and resources, a major source of food, employment and income in Butte County.
 - Policy AG-P1.1 The County supports State and federal legislation designed to conserve soil and protect agricultural land.

- Policy AG-P1.2 The County supports agricultural education and research at Butte County educational institutions.
- **Policy AG-P1.3** Continue to work with landowners in establishing new and maintaining existing Williamson Act contracts.
 - **Objective D2N-06.2** Protection of soil resources.
 - a. To eliminate potential for soil erosion or degradation of its agricultural productivity.
- Policy D2N-P6.5 Require standard erosion-control measures and construction practices to minimize soil erosion.
- o **Policy D2N-P6.6** Protect agricultural lands which currently produce, or have the potential to produce, from encroaching urban uses.

The Conservation and Open Space Element and Area and Neighborhood Plans Element contain the following goals, policies, actions, and objectives related to mineral resources.

- **Goal COS-12** Protect economically viable mineral resources and related industries while avoiding land use conflicts and environmental impacts from mining activities.
 - o **Policy COS-P12.1** Sufficient aggregate resources to meet the County's fair share of future regional needs shall be conserved.
 - Policy COS-P12.2 Mineral resources identified by the State to be of regional or statewide significance for mineral resource extraction shall be conserved.*
 - Policy COS-P12.3 Permitted uses on lands containing and adjacent to important mineral resources shall be restricted to those compatible with mineral extraction, except in cases where such uses offer public benefits that outweigh those of resource extraction.
 - Policy COS-P12.4 Prior to approval of any new or expanded mining operation, the applicant shall demonstrate that the operation will not create significant nuisances, hazards or adverse environmental effects.
 - o **Policy COS-P12.5** New mineral haul routes shall avoid landslides, highly erodible soils, residential areas and schools, when feasible.
 - Policy COS-P12.6 Discretionary development projects in the vicinity of permitted mining extraction sites or along existing haul routes shall record a notice of the right to mine against the property for which a discretionary permit is sought. The notice shall advise owners and subsequent interests in ownership that the existing mining operation has a permitted right to continued mining operations.
 - Policy COS-P12.7 Mined property shall be left in a condition suitable for reuse in conformance with the General Plan land use designations and in accordance with the California Surface Mining and Reclamation Act (SMARA).
 - Action COS-A12.1 Apply zoning regulations permitting extraction and processing as a conditional use on any lands classified by the State Mining and Geology Board as Mineral Resource Zone 2 (MRZ-2) or Scientific Zone (SZ).
- **Goal D2N-6** Utilize and develop natural resources so as to protect those resources and eliminate exposure of persons and property to environmental hazards.
 - o **Objective D2N-06.1** Management of mineral resources.

- **a.** Efficiently utilize mineral resources and ensure their continued supply.
- o **Policy D2N-P6.1** Encourage proper development and management of sand and gravel.
- **Policy D2N-P6.2** Ensure that all commercial development of sand and gravel deposits is compatible with nearby land uses.
- Policy D2N-P6.3 Ensure that extraction operations of sand and gravel adhere to all environmental quality regulations of the County and State.
- Policy D2N-P6.4 Locate commercial, industrial, open space and agricultural uses adjacent
 to prime mineral resource areas to avoid conflicts between mineral production activities
 and present or planned residential and institutional land uses.

County Ordinance

Many California counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. As part of the grading permit, a project applicant must submit a grading and erosion control plan, project vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include an extensive list of BMPs similar to those contained in a SWPPP.

The purpose of the grading portion of the Butte County Grading and Mining Ordinance is "the control of erosion and siltation, the enhancement of slope stability, the protection of said resources and the prevention of related environmental damage by establishing standards and requiring permits for grading." In general, a grading permit is required for any earthmoving activities involving 50 cubic yards or more of material. Depending on the project, the county may require environmental review, engineering plans and specifications, soils engineering report, and/or an erosion and sediment control plan.

The purpose of the mining portion of the Butte County Grading and Mining Ordinance is to comply with the requirements of SMARA, encourage production and conservation of mineral resources in balance with other beneficial uses, and prevent or minimize damage to the environment. Applicants must file a permit application with the county, submit mining and reclamation plans, and provide financial assurances. The application then goes through a review and public hearing process before a determination is made by the Butte County Planning Commission.

City of Biggs

City of Biggs General Plan

The Public Health and Safety Element of the City of Biggs General Plan (City of Biggs 1998) includes the following goal, policies, and program related to geologic and seismic hazards.

- Goal 6.5 Minimize the threat of personal injury and property damage due to seismic and geologic hazards.
 - Policy 6.5.A Consider the potential for expansive soils and earthquake related hazards when reviewing applications for developments.
 - Policy 6.5.B A soils report, prepared by a licensed soils engineer, shall be required for all residential subdivisions and development projects. Soils reports shall evaluate shrink/swell

and liquefaction potential of sites and recommend measures to minimize unstable soil hazards.

- Policy 6.5.C Applications for projects which extract groundwater, oil, or gas shall include a report evaluating the potential for resulting subsidence. Reports shall discuss appropriate mitigation measures to reduce the potential for subsidence.
- Policy 6.5.D The City encourages owners of buildings which are subject to seismic hazards to pursue structural improvements to remedy seismic related hazards.
- **Program 6.5.E** The City shall pursue funding options to assist property owners with costs related to seismic safety structural improvements.

The Public Health and Safety Element of the plan contains the following policies related to mineral resources.

- Goal 5.1: Promote and protect the continued viability of agriculture surrounding Biggs.
 - o **Policy 5.1.D** No mineral, gas or other natural resource extraction shall occur within the City limits of Biggs without prior review and approval of the activity by the City.
 - Policy 5.1.E Ensure that any mineral extraction activities within the Biggs planning area to conform with the State Mining and Reclamation Act (SMARA) requirements, including financial assurances and reclamation plans.

City of Gridley

City of Gridley 2030 General Plan

The Safety Element of the City of Gridley 2030 General Plan (City of Gridley 2010) includes the following goal, policies, and strategies related to geologic and seismic hazards.

- Safety Goal 1: To reduce risks to people and property from geologic hazards and soils conditions.
 - Safety Policy 1.1 New development shall implement state and local building code requirements, including those related to structural requirements and seismic safety criteria in order to reduce risks associated with seismic events and unstable and expansive soils.
 - o **Safety Policy 1.2** New developments that could be adversely affected by geological and/or soil conditions shall include project features that minimize these risks.
 - Safety Policy 1.3 The City will not allow new water well sites to be located in areas where subsidence could occur as a result of water well operation, or where the potential for subsidence could increase as a result of operation of a water well.
 - Safety Implementation Strategy 1.1

The City will continue to enforce the most recent statewide building code requirements.

• Safety Implementation Strategy 1.2

The City will require geotechnical evaluation and recommendations before development or construction of buildings meant for public occupancy in geologic hazard areas may proceed. Such evaluations will be required to focus on potential hazards related to liquefaction, erosion, subsidence, seismic activity, and other relevant geologic hazards

and soil conditions for development. New development would be required to incorporate project features that avoid or minimize the identified hazards to the satisfaction of the City.

The City of Gridley 2030 General Plan states that there are no significant mineral resources in the Gridley area and therefore does not address the topic (City of Gridley 2010:6–9).

A.3.3.2 Sutter County

Sutter County General Plan Policy Document

The Sutter County General Plan Policy Document (Sutter County 1996a) includes the following goal, policies, and program related to geologic and seismic hazards.

- **Goal 7.B** To minimize the risk of personal injury and property damage due to seismic and geological hazards.
 - **Policy 7.B-1** Where geologic hazards exist from landslides, the County should designate the land as open space or agriculture.
 - o **Policy 7.B-2** The County may require the preparation of a soils engineering and/or geologic-seismic analysis prior to permitting development in areas of geologic or seismic hazards (i.e., ground shaking, landslides, liquefaction, expansive soils).
 - Implementation Program
 - **7.1** The County shall continue to enforce provisions of the Uniform Building Code which address seismic design criteria.

Responsibility: Community Services Department

This document contains the following goal, policies, and implementation program related to mineral resources.

- Goal 4.H To encourage commercial resource extraction activities in locations where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated.
 - o **Policy 4.H-1** The County shall require that the development of gas and mineral resources be designed and conducted in a manner to minimize incompatibility with nearby land uses.
 - o **Policy 4.H-2** The County shall prohibit the establishment of any new mining operations in the Sutter Buttes.
 - o **Policy 4.H-3** The County shall require that all new gas and mineral extraction projects be designed to provide a buffer between existing and/or likely adjacent uses.
 - o **Policy 4.H-4** The County shall require that all mining operations prepare and implement reclamation plans and provide adequate security to guarantee the proposed reclamation.
 - Policy 4.H-5 The County shall require that gas, and mineral extraction projects incorporate
 adequate measures to minimize impacts to local residents, county roadways, services and
 facilities.

• Implementation Program

4.7 The County shall review and revise as necessary its ordinances governing gas and mineral extraction projects.

Responsibility: Community Services Department

Sutter County General Plan

The *Sutter County General Plan* (Sutter County 2011) includes the following goal and policies related to geologic and seismic hazards.

- **Goal PHS 2** Minimize the risk of personal injury and property damage due to geologic and seismic hazards and adverse soil conditions.
 - PHS 2.1 Review Standards. Review and enforce seismic and geologic safety standards and require the use of best management practices in site design and building construction methods. (PHS 2-A)
 - **PHS 2.2 Minimize Exposure to Geologic Hazards.** Minimize development in areas where geologic hazards exist from landslides and erosion.
 - O PHS 2.3 Site-Specific Geotechnical Analysis. Require the preparation of a County approved site-specific geotechnical analysis prior to approval of development in areas where the potential for geologic or seismic hazards exists (e.g., ground shaking, landslides, liquefaction, expansive soils, steep slopes, subsidence, and erosion) and incorporate recommended project features to avoid or minimize the identified hazards.
 - PHS 2.4 Essential Facilities. Promote the upgrade, retrofitting, and/or relocation of existing essential facilities (e.g., hospitals, schools, law enforcement and fire stations, etc.) that do not meet current building code standards and are within areas susceptible to seismic or geologic hazards.

The plan contains the following goal and policies related to mineral resources.

- Goal ER 5 Encourage commercial resource extraction activities in locations where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated.
 - **ER 5.1** Significant Resources. Conserve and protect mineral resources that may be identified by the state as a significant resource to allow for their continued use in the economy.
 - ER 5.2 Compatible Operations. Require that gas and mineral resource extraction activities be designed and operated to minimize incompatibilities with nearby land uses and incorporate features that buffer existing and planned adjacent uses. Extraction activities shall incorporate adequate measures to minimize impacts to local residents, county roadways, services, facilities, and the environment.
 - ER 5.3 No New Operations in Sutter Buttes. Prohibit the establishment of any new mining operations in the Sutter Buttes, which is defined as the area within the Sutter Buttes Overlay Zone.
 - ER 5.4 Reclamation. Encourage disturbed mined areas to be reclaimed concurrent with mining (i.e., phased reclamation), and require reclamation that is consistent with an adopted reclamation plan, as appropriate, and in conjunction with the Surface Mining and

Reclamation Act, and County and state standards to a condition that is sensitive to the natural environment and where subsequent, beneficial uses can occur.

County Codes and Ordinances

The purpose of the County of Sutter Land Grading and Erosion Control (Chapter 1770) ordinances is to minimize damage or degradation to waterways caused by excavation-related activities and comply with the provisions of NPDES permits covering the activities of the county issued by the RWQCB.

A grading permit is required in the unincorporated portion of the county for:

grading to (1) grade, fill, excavate, store or dispose of 350 cubic yards or more of soil or earthly material, or (2) clear and grub one acre or more of land, or (3) grade, fill, or store 50 cubic yards or more of soil or earthly material in a designated floodway, or (4) relocate, reshape, re-route, obstruct, or alter an existing water course.

The purpose of the Sutter County Surface Mining and Reclamation Code is to "provide local procedures, processes and responsibilities for the implementation of SMARA and other State regulations pertaining to surface mining in Sutter County." Applicants must file a permit application with the county, submit mining and reclamation plans, and provide financial assurances. These documents are reviewed by the State Mining and Geology Board and the Sutter County Planning Commission. Approval is granted or denied by the planning commission.

Sutter County and the City of Yuba City adopted the 2010 California Building Code as part of their building standards. The Butte County Building Design Criteria incorporated the 2007 California Building Code.

City of Yuba City

Yuba City General Plan

The City of Yuba City General Plan (City of Yuba City 2004) contains the following policies related to geologic and seismic hazards.

- **Guiding Policy 9.2-G-1** Minimize risks of property damage and personal injury posed by geologic and seismic hazards.
 - o **Implementing Policy 9.2-I-1** Review proposed development sites at the earliest stage of the planning process to locate any potential geologic or seismic hazards. Following receipt of a development proposal, engineering staff shall review the plans to determine whether a geotechnical review is required. If the review is required, then the applicant shall be referred to geotechnical experts for further evaluation.
 - Implementing Policy 9.2-I-2 Prohibit structures intended for human occupancy within 50 feet of an active fault trace. Although no active faults are located within the Planning Area, this policy would apply if a new fault was discovered. It is also the City's intent to discourage homes, offices, hospitals, public buildings, and other similar structures over the trace of an inactive fault and to allow uses within setback areas that could experience displacement without undue risk to people and property.
 - o **Implementing Policy 9.2-I-3** Require comprehensive geologic and engineering studies of critical structures regardless of location. Critical structures are those most needed following

a disaster or those that could pose hazards of their own if damaged. They include utility centers and substations, water reservoirs, hospitals, fire stations, police and emergency communications facilities, and bridges and overpasses.

- o **Implementing Policy 9.2-I-4** Require preparation of a soils report as part of the development review and/or building permit process for development proposed in the area depicted with expansive soils. The southwest corner of the City is underlain by expansive soils that must be taken into account during building design if cracking and settling of structures are to be minimized. The report would not be necessary when soil characteristics are known, and the City's Building Official or Public Works Director determines it is not needed.
- o **Implementing Policy 9.2-I-5** Provide information for property owners to rehabilitate existing buildings using construction techniques to protect against seismic hazards. The City-adopted Uniform Building Code specifies seismic standards for new construction, as well as for additions or expansions to buildings. It is in the community's best interest to do all that is necessary to ensure that all structures meet current seismic standards.

City of Live Oak

City of Live Oak 2030 General Plan

The Public Safety Element of the City of Live Oak 2030 General Plan (City of Live Oak 2010) contains the following goal and policies related to geologic and seismic hazards.

- Goal PS-1. Design buildings to prevent property damage and injury from hazards.
 - Policy PS-1.1 All new buildings in the City shall be built under the seismic requirements of the California Building Code.
 - **Policy PS-1.2** The City will encourage the retrofitting of older buildings to current safety standards, as specified in locally applicable fire and building codes.
 - o **Policy PS-1.3** New development shall ensure adequate water flow for fire suppression as required by City Public Works Improvement Standards.

The Conservation and Open Space Element contains the following goal and policy related to mineral resources.

- **Goal MINERAL-1.** Protect soil and mineral resources in the Live Oak Study Area consistent with other environmental, social, and economic goals.
 - Policy Mineral-1.1 The City will coordinate with the state to incorporate, as necessary, any
 policies for conservation and possible future extraction of mineral or soil resources of
 regional or statewide significance.

A.3.3.3 Yuba County

County Ordinance Code

Title X, Buildings and Construction, of the Yuba County Ordinance Code, outlines all provisions relevant to grading and construction within the county. Chapter 10.05 addresses standards of construction, Chapter 10.30 addresses construction in areas of flood hazard, and Chapter 11.25 provides regulations related to grading and excavations. Chapter 11.25 also sets forth means for

controlling soil erosion and problems associated with excavations, grading, and fill. The provisions provided in this chapter apply to the unincorporated areas of Yuba County.

A.3.4 Traffic, Transportation, and Navigation

A.3.4.1 Butte County

Butte County General Plan

The Circulation Element of the *Butte County General Plan*, adopted in 2010, is concerned with the safe and efficient movement of people and goods in and around the County. The element contains background circulation information for a wide range of existing and planned transportation modes, including roads, transit, non-motorized transportation, rail and aviation. To ensure that the county's transportation system can accommodate growth anticipated during the 20-year planning period, the Circulation Element works closely with the Land Use Element of the general plan, as required by Section 65302(b) of the California Government Code. The following goals and policies are applicable to traffic.

- **Goal CIR-6** Support a balanced and integrated road and highway network that maximizes the mobility of people and goods in a safe, efficient manner.
 - Policy CIR-P6.1 The level of service for County-maintained roads within the
 unincorporated areas of the county but outside municipalities' sphere of influences (SOI)
 shall be level of service C or better during the PM peak hour. Within a municipality's SOI, the
 level of service shall meet the municipality's level of service policy.
 - **Policy CIR-P6.2** The level of service on State Highways should at least match the concept level of service for the facility, as defined by Caltrans.

Butte County roadway level of service (LOS) thresholds are provided in Table A-2, below.

Table A-2. Butte County Roadway Level of Service Thresholds

Facility Type	A	В	С	D	Е	F
Minor 2–Lane Highway	0–900	901-2,000	2,001-6,800	6,801–14,100	14,101–17,400	>17,400
Major 2–Lane Highway/ Expressway	0-1,200	1,201–2,900	2,901–7,900	7,901–16,000	16,001–20,500	>20,500
4–Lane, Multi–Lane Highway/ Expressway	0-10,700	10,701–17,600	17,601–25,300	25,301–32,800	32,801–36,500	>36,500
2–Lane Arterial	_	_	0-9,700	9,701–17,600	17,601–18,700	>18,700
4-Lane Arterial, Undivided	_	_	0-17,500	17,501–27,400	27,401–28,900	>28,900
4-Lane Arterial, Divided	_	_	0-19,200	19,201–35,400	35,401–37,400	>37,400
6-Lane Arterial, Divided	_	_	0-27,100	27,101-53,200	53,201–56,000	>56,000
3–Lane Arterial, 1–Way Roadway	_	_	0–13,100	13,101–20,600	20,601–21,700	>21,700
2–Lane Freeway	0-11,110	11,111–20,100	20101–28,800	28,801-35,700	35,701–40,100	>40,100
2–Lane Freeway + Auxiliary Lane	0-14,100	14,101–25,500	25,501–36,400	36,401–44,900	44,901–50,350	>50,350
3–Lane Freeway	0-17,000	17,001–30,800	30,801–44,000	44,001–54,100	54,101–60,600	>60,600
3–Lane Freeway + Auxiliary Lane	0-20,100	20,101–36,400	36,401–51,800	51,801–63,500	63,501–71,000	>71,000
4–Lane Freeway	0-23,200	23,201–42,000	42,001–59,500	59,501-72,800	72,801–81,400	>81,400
Major 2-Lane Collector	_	_	0-5,550	5,551–11,800	11,801–15,200	>15,200

Source: Transportation Research Board, Highway Capacity Manual. 2000.

City of Biggs

City of Biggs General Plan

The City of Biggs General Plan 1997–2015 outlines goals, policies, and guidelines that relate to transportation and circulation within the city. The following policy in the Circulation Element is applicable to traffic.

 Policy 2.1.G Functional performance of roadways throughout the community shall be maintained at a Level of Service C or better and shall conform with the Roadway Environmental Capacity as defined in Table 2.3 of this Element.

City of Gridley

City of Gridley 2030 General Plan

The *City of Gridley 2030 General Plan* outlines goals, policies, and guidelines that relate to transportation and circulation within the city. The following goals and policies in the Circulation Element are applicable to traffic.

- **Circulation Goal 4**: To improve connectivity in existing developed parts of Gridley.
 - Circulation Policy 4.2: The City will increase connectivity in the Highway 99 corridor by requiring new east-west and north-south connections in new developments, to the maximum extent feasible.

- **Circulation Goal 8**: To provide efficient and effective freight systems that serve Gridley's businesses, while avoiding negative impacts to residents
 - Circulation Policy 8.2: The City will restrict truck traffic to Highway 99, Magnolia Avenue, West Biggs-Gridley Road, Ord Ranch Road, South Avenue, East Gridley Road, West Liberty Road, and streets in areas designated for Industrial and Agricultural Industrial development (see Exhibit Circulation-7). Trucks may go by direct route to and from restricted streets, where required for the purpose of making pickups and deliveries of goods, but are otherwise restricted to truck routes.

A.3.4.2 Sutter County

2011 Sutter County General Plan and General Plan Technical Background Report

The 2011 Sutter County General Plan outlines goals, policies, and guidelines that relate to transportation and circulation within the county (Sutter County 2012: 6-9). The following goals and policies are applicable to traffic.

- **Goal M2** Provide for the long-range planning and development of the County's roadway system and the safe, efficient, and reliable movement of people and goods throughout Sutter County.
 - Policy M 2.1 Plan, design, and regulate roadways in accordance with the circulation diagram contained within this element and the California Road System Functional Classification System as updated and approved by the Federal Highway Administration, unless otherwise addressed in an adopted specific plan or community plan.
 - Policy M 2.5 Develop and manage the County roadway segments and intersections to maintain LOS D or better during peak hour, and LOS C or better at all other times. Adjust for seasonality. These standards shall apply to all County roadway segments and intersections, unless otherwise addressed in an adopted specific plan or community plan.
 - Policy M 2.8 Coordinate with the cities of Yuba city and Live Oak to provide acceptable and compatible levels of service on roadways that cross county/City boundaries and when establishing future road alignments within the cities' spheres of influence.
 - Policy M 2.10 maintain ongoing coordination with Caltrans, SACOG and other jurisdictions to address local and regional transportation issues.
 - Policy M 2.11 Support projects that will improve traffic flows and safety on State Highways.
 - Policy M 2.14 Develop local roads parallel to State Highways, where feasible, to reduce congestion and increase traffic safety on state facilities.

In addition to the above policies, the *General Plan Technical Background Report* states that the California Department of Transportation (Caltrans) has adopted LOS D as the minimum acceptable standard for SR 20 west of Humphrey Road and LOS E as the minimum acceptable standard for SR 20 east of Humphrey Road (Sutter County 2008: 3.2-2). SR 99 has a minimum acceptable LOS of E throughout the county.

Sutter County roadway LOS thresholds are provided in Table A-3.

Table A-3. Sutter County Roadway Level of Service Thresholds

Roadway	LOS C	LOS D	LOS E
Rural—Two Lane	7,000–10,600	10,600–16,400	16,400–25,200
Urban—Three Lane	15,330-17,520	17,520–19,700	19,700-21,900
Urban—Five Lane	30,660-35,040	35,040-39,420	39,420–43,800
Expressway—Four Lane	29,100-41,800	41,801-53,500	53,501-59,500
Freeway—Four Lane	33,700-48,400	48,401–60,000	60,001–67,400
Freeway—Six Lane	51,800-73,900	73,901–90,900	90,901–101,800
Source: Sutter County 2008	3		

City of Yuba City

Yuba City General Plan

The *Yuba City General Plan* outlines goals, policies, and guidelines that relate to transportation and circulation within the city. The following policies in the Transportation Element are applicable to traffic.

Policy 5.2-G-4 Coordinate local actions with state and County agencies to ensure consistency.

Policy 5.2-G-7 Maximize the carrying capacity of arterial roadways by controlling the number of intersections and driveways, prohibiting residential access, and requiring sufficient offstreet parking to meet the needs of each project.

Policy 5.2-I-12 Develop and manage the roadway system to obtain LOS D or better for all major roadways and intersections in the City. This policy does not extend to residential streets (i.e., streets with direct driveway access to homes) or bridges across the Feather River nor does the policy apply to state highways and their intersections, where Caltrans policies apply. Exceptions to LOS D policy may be allowed by the City Council in areas, such as downtown, where allowing a lower LOS would result in clear public benefits. Specific exceptions granted by the Council shall be added to the list of exceptions below:

- o SR 20 (SR 99 to Feather River Bridge) LOS F is acceptable;
- o SR 20 (Feather River Bridge) LOS F is acceptable;
- o Bridge Street (Twin Cities Bridge) LOS F is acceptable; and
- Lincoln Road (New Bridge across the Feather River) LOS F is acceptable.
- No new development will be approved unless it can be shown that required level of service can be maintained on the affected roadways.

Policy 5.4-I-2 Develop bicycle routes that provide access to schools, parks, and the Feather River Parkway.

Policy 5.6-I-1 In consultation with Sutter County and Caltrans, designate and provide signed truck routes, ensure that adequate pavement depth, lane widths, bridge capacities, loading areas, and turn radii are maintained on the designated truck routes, and prohibit commercial trucks from non-truck routes except for deliveries. Require that a truck route be provided for

any approved development zoned regional commercial, community commercial, business technology and light industrial, or manufacturing, processing, and warehousing.

Policy 5.6-I-2 Maintain design standards for industrial streets that incorporate heavier loads associated with truck operations and larger turning radii to facilitate truck movements.

Policy 5.6-I-3 Continue to ensure adequate truck access to off-street loading areas in commercial areas.

Policy 5.6-I-4 Encourage regional freight movement on freeways and other appropriate routes; evaluate and implement vehicle weight limits as appropriate on arterial, collector, and local roadways to mitigate truck traffic impacts in the community.

The Yuba City General Plan does not identify LOS thresholds.

City of Live Oak

City of Live Oak 2030 General Plan

The *City of Live Oak 2030 General Plan* outlines goals and policies that relate to transportation and circulation within the city. The following goal and policy of the Circulation Element are applicable to traffic.

- **Goal CIRC-5** Allow for efficient delivery of materials and shipment of products for Live Oak businesses without adversely affecting residents.
 - Policy CIRC-5.2 The City will consult with Caltrans, Sutter County, the California Highway
 Patrol, the California Public Utilities Commission, and the Union Pacific Railroad Company to
 appropriately regulate the safe movement of truck traffic and hazardous materials
 throughout the City.

A.3.5 Air Quality

A.3.5.1 Butte County

Butte County Air Quality Management District List of Rules

The Butte County Air Quality Management District (BCAQMD) has adopted local rules to reduce emissions throughout the district. Portions of the project in Butte County may be subject to the following rules and regulations (California Air Resources Board 2010b).

- **Rule 200 (Nuisance)**: Prohibits the discharge of air contaminants or other materials which cause injury, detriment, nuisance, or annoyance.
- **Rule 201 (Visible Emissions)**: Prohibits the discharge of air containments for a period or periods aggregating more than 3 minutes in any 1 hour.
- **Rule 202 (Particulate Matter Concentrations)**: Prohibits the discharge of particulate matter (PM) in excess of 0.3 grain per cubic foot of gas at standard conditions.
- **Rule 205 (Fugitive Dust Emissions)**: Limits the quantity of PM through BMPs.
- **Rule 252 (Stationary Internal Combustion Engines)**: Limits emissions of oxides of nitrogen (NO_X) and carbon monoxide (CO) from stationary internal combustion engines (if construction requires engines rated at more than 50 brake horsepower).

• Rule 309 (Wildland Vegetation Management Burning): Establishes standards for the use of wildland vegetation management burning, range improvement burning, and forest management burning.

A.3.5.2 Sutter County

Feather River Air Quality Management District List of Rules

Similar to the BCAQMD, the Feather River Air Quality Management District (FRAQMD) has developed local rules to reduce emissions throughout the district. The proposed project may be subject to the following FRAQMD rules. Failure to comply with any applicable district rule would be a violation subject to district enforcement action (California Air Resources Board 2009).

- **Rule 2.0 (Open Burning)**: Establishes standards for open burning to be conducted in a manner that minimizes emissions and smoke.
- **Rule 3.0 (Visible Emissions)**: Prohibits the discharge of air containments for a period or periods aggregating more than 3 minutes in any 1 hour.
- **Rule 3.2 (Particulate Matter)**: Prohibits the discharge of PM in excess of 0.3 grains per cubic foot of gas at standard conditions.
- **Rule 3.16 (Fugitive Dust Emissions)**: Limits emissions of fugitive dust from being airborne beyond the property line from which the emission originates.
- **Rule 3.22 (Stationary Internal Combustion Engines)**: Limits emissions of NO_x, reactive organic gases (ROG), and CO from stationary internal combustion engines (if construction requires engines rated at more than 50 brake horsepower).

FRAQMD has established significance thresholds for the evaluation of criteria pollutant emissions. These thresholds are based on the district's Indirect Source Review (ISR) Guidelines (Feather River Air Quality Management District 2010). FRAQMD's main CEQA guidance is found in the ISR guidelines, and additional clarifying language is located on their website (Feather River Air Quality Management District 2010). The district requires construction and operational emissions to be quantified for the determination of mitigation measures.

A.3.6 Vegetation

A.3.6.1 Butte County

Butte County General Plan 2030

The policies below are taken from the Conservation and Open Space Element of the Butte County General Plan 2030, adopted in October 2010 (Butte County 2010:235–240). These policies are designed to guide planning related to and affecting habitat and biological resources, including vegetation and wetlands, within Butte County's jurisdiction.

- **Goal COS-6:** Engage in cooperative planning efforts to protect biological resources.
 - **COS-P6.1** The County shall coordinate with applicable federal, State, regional and local agencies on natural resources and habitat planning.

- Goal COS-7: Conserve and enhance habitat for protected species and sensitive biological communities.
 - **COS-P7.1** Conservation easements that protect habitat areas, habitat corridors and sensitive biological resources shall be promoted.
 - cos-P7-2 Clustered development patterns shall be encouraged in order to conserve habitat for protected species and biological resources.
 - COS-P7.3 Creeks shall be maintained in their natural state whenever possible, and creeks and floodways shall be allowed to function as natural flood protection features during storms.
 - COS-P7.6 New development projects shall include setbacks and buffers along riparian corridors and adjacent to habitat for protected species, except where permitted in the Butte Regional Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP) Planning Area and where such development is consistent with the conditions of the HCP/NCCP, upon the future adoption of the [Butte Regional] HCP/NCCP.
 - COS-P7.7 Construction barrier fencing shall be installed around sensitive resources on or adjacent to construction sites. Fencing shall be installed prior to construction activities and maintained throughout the construction period.
 - COS-P7.8 Where sensitive on-site biological resources have been identified, construction employees operating equipment or engaged in any development-associated activities involving vegetation removal or ground disturbing activities in sensitive resource areas shall be trained by a qualified biologist and/or botanist who will provide information on the on-site biological resources (sensitive natural communities, special status plant and wildlife habitats, nests of special-status birds, etc.), avoidance of invasive plant introduction and spread, and the penalties for not complying with biological mitigation requirements and other state and federal regulations.
 - o **COS-P7.9** A biologist shall be retained to conduct construction monitoring in and adjacent to all habitats for protected species when construction is taking place near such habitat areas.
- **Goal COS-8:** Maintain and promote native vegetation.
 - COS-P8.1 Native plant species shall be protected and planting and regeneration of native plant species shall be encouraged, wherever possible, in undisturbed portions of development sites.
 - o **COS-P8.2** New landscaping shall promote the use of xeriscape and native tree and plant species, including those valued for traditional Native American cultural uses.
- **Goal COS-9:** Protect identified special-status plant and animal species.
 - COS-P9.1 A biological resources assessment shall be required for any proposed development project where special-status species or critical habitat may be present. Assessments shall be carried out under the direction of Butte County. Additional focused surveys shall be conducted during the appropriate season if necessary. Upon adoption of the Butte Regional Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP), assessment requirements of the [Butte Regional] HCP/NCCP shall be implemented for development projects within the [Butte Regional] HCP/NCCP area.

- o **COS-P9.2** If special-status plant or animal species are found to be located within a development site, proponents of the project shall engage in consultation with the appropriate federal, state and regional agencies and mitigate project impacts in accordance with state and federal law. Upon adoption of the Butte Regional Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP), mitigation requirements of the [Butte Regional] HCP/NCCP shall be implemented for development projects within the [Butte Regional] HCP/NCCP area. Examples of mitigation may include:
 - a. Design the proposed project to avoid and minimize impacts.
 - b. Restrict construction to specific seasons based on project-specific special-status species issues (e.g. minimizing impacts to special-status nesting birds by constructing outside of the nesting season).
 - c. Confine construction disturbance to the minimum area necessary to complete the work.
 - d. Mitigate for the loss of special-status species by purchasing credits at an approved conservation bank (if a bank exists for the species in question), funding restoration or habitat improvement projects at existing preserves in Butte County, or purchasing or donating mitigation lands of substantially similar habitat.
 - e. Maintain a minimum 100-foot buffer on each side of all riparian corridors, creeks and streams for special-status and common wildlife.
 - f. Establish setbacks from the outer edge of special-status species habitat areas.
 - g. Construct barriers to prevent compaction damage by foot or vehicular traffic.

Butte County Regional Habitat Conservation Plan/Natural Community Conservation Plan

Butte County is currently preparing a Butte Regional Habitat Conservation Plan/Natural Community Conservation Plan (Butte Regional HCP/NCCP) that will provide comprehensive species, wetlands, and ecosystem conservation and contribute to the recovery of endangered species within the plan area while also providing a more streamlined process for environmental permitting. Plan goals that will support the conservation of vegetation and wetland resources include the following.

- Balance open space, habitat, agriculture and urban development.
- Allow for appropriate and compatible growth and development in the Butte County region.
- Preserve aquatic and terrestrial resources and provide habitat for threatened and endangered species through conservation partnerships with local agencies.
- Provide greater conservation values than a project-by-project, species-by-species review.

The first administrative draft is a work-in-progress (available: http://www.buttehcp.com/BRCP-Documents/1st-Admin-Draft-BRCP/index.html) and finalization and adoption of the plan is scheduled for late 2012 or early 2013.

City of Biggs

City of Biggs General Plan 1997-2015

The policies below are taken from the Conservation and Open Space Element of the City of Biggs General Plan 1997–2015, adopted in 1998 (City of Biggs 1998:5-5–5-6). These policies are designed to guide planning related to and affecting habitat and biological and mineral resources within the City of Biggs' jurisdiction.

- **Policy 5.2.A** Apply mitigation measures to development projects to minimize impacts to biological resources during and after construction.
- **Policy 5.2.B** Consider opportunities for habitat preservation and enhancement in conjunction with public facility projects, particularly storm drainage facilities.
- **Policy 5.2.D** If the presence of protected species is determined to be likely, the project applicant shall be responsible for all costs associated with investigating species presence and preparation of any required mitigation plans.
- **Policy 5.2.E** Promote the establishment of an open space reserve along Hamilton Slough in areas southeast and south of the current City limits.

Municipal Code

According to Section 9.15.080 of the City of Biggs Municipal Code, *Tree care, planting, removing, and replacement – Permit required*, it is unlawful and prohibited for any person other than the superintendent or their authorized agent or deputy to cut, trim, prune, spray, brace, plant, move, remove, or replace any tree in any public street within the city.

City of Gridley

City of Gridley 2030 General Plan

The policies below are taken from the Conservation Element of the City of Gridley 2030 General Plan, adopted in December 2009 (City of Gridley 2010:17). These policies are designed to guide planning related to biological resources, including vegetation and wetlands, within the City of Gridley's jurisdiction.

- **Policy 5.1** New developments shall use techniques, such as buffers, setbacks, and clustering of development to protect wetlands, riparian corridors, vernal pools, and sensitive species.
- **Policy 5.3** The City will have former agricultural drainage ditches improved or restored in a way that avoids or improves habitat value and maintains or improves wetland function.
- **Policy 5.4** The City will condition new development, as necessary, to reduce erosion, siltation, and mitigate impacts to wetland, riverine, and riparian habitats.
- **Policy 5.7** The City will ensure consistency of new development with applicable portions of the Butte County Habitat Conservation Plan and Natural Communities Conservation Plan.
- **Policy 5.9** The City will continue to collaborate with the California Department of Fish and Game and the United States Fish and Wildlife Service, as appropriate, to ensure the protection and preservation of special-status species and their habitats within the Gridley Planning Area.

A.3.6.2 Sutter County

Yuba-Sutter Habitat Conservation Plan/Natural Community Conservation Plan

Yuba and Sutter Counties are currently preparing a regional HCP, referred to as the Yuba-Sutter HCP/NCCP. The plan will include conservation goals, objectives, and measures that aim to preserve covered plant and wildlife species and important natural and agricultural communities that support these species as well as other local native and migratory wildlife within the plan area.

According to the November 2011 Planning Agreement (available: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=39871>), the preliminary conservation objectives for the Plan are as follows.

- Provide for the protection of species and natural communities on an ecosystem or a landscape level
- Preserve the diversity of plant and animal communities in the Planning Area;
- Assure connectivity to and compatibility with conserved areas within and adjacent to the Planning area boundaries.
- Protect the viability of threatened, endangered or other special status plant and animal species, and minimize and mitigate the take or loss of the Covered Species;
- Identify and designate biologically sensitive habitat areas;
- Preserve habitat and thereby contribute to the recovery of the Covered Species; and
- Reduce the need to list additional species.

Sutter County General Plan—Public Draft

The biological resource and open space policies below are taken from the Environmental Resources chapter of the *Sutter County General Plan—Public Draft*, released for public comment in fall 2010 (Sutter County 2010:9-4–9-7). These policies are designed to guide planning related to biological resources, including vegetation and wetlands, within Sutter County's jurisdiction.

- Policy ER 1.3 Focus conservation efforts on areas identified as having very high and high
 habitat value as well as Sutter County's unique natural open space resources, including the
 Sutter Buttes, Sutter Bypass, Butte Sink, and the Sacramento, Feather, and Bear River corridors.
- **Policy ER 1.4** Emphasize the preservation, enhancement, and creation of sustainable, interconnected habitat and open space areas that highlight unique resources and integrate educational and recreational opportunities as appropriate.
- **Policy ER 1.7** Mitigate biological and open space effects that cannot be avoided in accordance with an applicable Habitat Conservation Plan and federal, state, and local regulations.
- Policy ER 1.10 Identify and pursue economically viable methods and funding sources for the long-term maintenance and management of significant biological and open space resource areas, including state and federal programs.
- Policy ER 2.2 Encourage and support the Sutter County Resource Conservation District's
 programs that facilitate preservation and restoration of natural wetland environments as long
 as these programs do not significantly affect Sutter County agricultural lands and flood control
 operations.

- **Policy ER 2.4** Encourage the creation and use of regional wetland mitigation banks to the extent that they do not conflict with Sutter County agricultural lands and flood control operations
- **Policy ER 3.1** Preserve special-status fish, wildlife, and plant species (e.g., rare, threatened, or endangered species) and habitats consistent with an applicable Habitat Conservation Plan and federal, state, and local regulations.
- Policy ER 3.2 Coordinate with federal, state, and local resource agencies (e.g., California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) to protect special-status species.
- **Policy ER 3.3** Support the preservation and re-establishment of fisheries in the rivers and streams within Sutter County.
- **Policy ER 3.4** Preserve and protect waterfowl resources along the Pacific Flyway Migration Corridor.
- **Policy ER 3.5** Preserve and enhance wildlife movement corridors between natural habitat areas to maintain biodiversity and prevent the creation of biological islands. Preserve contiguous habitat areas when possible.
- Policy ER 3.6 Preserve important areas of natural vegetation and the ecological integrity of
 these habitats, where feasible, including but not limited to riparian, vernal pool, marshes, oak
 woodlands and annual grasslands.
- **Policy ER 3.7** Preserve native oak trees when possible through the review of discretionary development projects and activities. Reduce the loss of oak trees through consideration of tree mitigation/replanting programs.
- **Policy ER 3.8** Encourage the use of native and drought tolerant plant materials, including native tree species, in all public and private landscaping and revegetation projects.
- **Policy ER 4.1** Preserve natural landforms, natural vegetation, and natural resources as open space to the extent feasible.
- **Policy ER 4.2** Preserve the Sutter Buttes as an important agricultural, cultural, historic, habitat, and open space resource. Promote and support efforts by willing landowners to increase opportunities for public access to the Sutter Buttes and other open space areas.
- **Policy ER 4.3** Preserve the Sacramento, Feather, and Bear River corridors as important habitat, recreation and open space resources. Support efforts to increase public access and recreational uses along the County's river corridors.
- **Policy ER 4.4** Support efforts to acquire additional open space adjoining protected natural resource areas to increase the size, connectivity, and buffering of existing habitat.
- Policy ER 4.6 Prohibit land mitigation within Sutter County for projects within other
 jurisdictions unless there is a benefit to Sutter County. Benefits can include, but are not limited
 to, providing flood protection for Sutter County, providing opportunities for Sutter County
 projects' use of the area for mitigation, or making the natural resources available for the
 enjoyment of Sutter County residents.

City of Yuba City

Yuba City General Plan

The guiding and implementation policies below are taken from the Environmental Conservation chapter of the City of Yuba City General Plan, adopted in 2004 (City of Yuba City 2004:8-13–8-14). These policies are designed to guide planning related to biological resources, including vegetation and wetlands, within the City of Yuba City's jurisdiction.

- **Policy 8.4-G-1** Protect special status species, in accordance with State regulatory requirements.
- Policy 8.4-G-2 Protect and enhance the natural habitat features of the Feather River and new open space corridors within and around the urban growth area.
- Policy 8.4-G-3 Preserve and enhance heritage oaks in the Planning Area.
- **Policy 8.4-G-4** Where appropriate, incorporate natural, wildlife habitat features into public landscapes, parks, and other public facilities.
- **Policy 8.4-G-5** Support the preservation and enhancement of fisheries in the Feather River.
- **Policy 8.4-I-2** Require preservation of oak trees and other native trees that are of a significant size, by requiring site designs to incorporate these trees to the maximum extent feasible.
- **Policy 8.4-I-3** Require, to the extent feasible, use of drought tolerant plants in landscaping for new development, including private and public projects.
- **Policy 8.4-I-4** Require measures, as part of the Feather River Parkway Plan, to protect and enhance riparian zones, natural areas and wildlife habitat qualities; and establish and maintain protection zone along the river where development shall not occur, except a part of the parkway enhancement (e.g., trails and bikeways). For park improvements, require a buffer zone along the river in which no grading or construction activities will occur, except as needed for shoreline uses such as boat docks.
- **Policy 8.4-I-5** Establish wildlife corridors in conjunction with implementation of the Feather River Parkway Plan to minimize wildlife-urban conflicts.
- **Policy 8.4-I-6** Work with California Department of Fish and Game and other agencies to enhance and preserve fisheries in the Feather River.

Municipal Code

According to municipal code Section 9-2.04, *Care of trees, shrubbery, and lawns*, "it shall be unlawful for any person to damage, cut, carve, transplant, or remove any tree, plant, wood, turf, or grass, or pick the flowers or seeds of any tree or plant, or attach any rope, wire, or other object to any tree or plant located in any park or recreation area." The Feather River bike trail, a recreational facility, falls within the biological study area.

City of Live Oak

City of Live Oak 2030 General Plan

The policies below are taken from the Conservation and Open Space Element of the City of Live Oak 2030 General Plan (City of Live Oak 2010: CO-4–CO-9). These policies are designed to guide

planning related to and affecting habitat and biological resources, including vegetation and wetlands, within the City of Live Oak's jurisdiction.

- **Goal BIOLOGICAL-1**. Protect and enhance habitat suitable for special-status species that can occur in the Study Area.
 - Policy Biological-1.1 Applicants of projects that have the potential to negatively affect special-status species or their habitat shall conduct a biological resources assessment and identify design solutions that avoid such adverse effects. If adverse effects cannot be avoided, then they shall be mitigated in accordance with guidance from the appropriate state or federal agency charged with the protection of these species.
- **Goal BIOLOGICAL-2**. Protect native oak and other large tree species occurring throughout the Study Area that provide valuable habitat for wildlife species and contribute to the historic and aesthetic character of the city.
 - o Policy Biological-2.1 New developments shall preserve all native oaks with a diameter at breast height (dbh) of 6 inches or greater and all other trees that have a dbh of 30 inches or greater, to the maximum extent feasible.
- Goal BIOLOGICAL-3. Protect and enhance existing riparian habitat within the Study Area.
 - Policy Biological-3.1 Where feasible, the City will require that new developments avoid the conversion of existing riparian habitat and require that an adequate buffer of the associated riparian areas be established to protect this resource. Where feasible, the riparian buffers shall be incorporated into open space corridors, public landscapes, and parks. Riparian buffers shall be designed to preserve existing wildlife habitat; restore degraded habitat; provide habitat conditions favorable to native local wildlife; restrict activities that may adversely affect wildlife habitat quality within the established buffer zone; and provide interpretive features educating the public about the beneficial effects of native riparian habitat and activities that adversely affect wildlife.
 - Policy Biological-3.2 The City will take advantage of opportunities to enhance and restore
 existing riparian areas along Live Oak Slough and other drainage canals. Where feasible,
 these resources shall be incorporated into open space corridors, public landscapes, and park
 during the preparation of the Parks and Recreation Master Plan.
 - o **Policy Biological-3.3** The City will require new developments to avoid the loss of federally protected and state-protected wetlands. If loss is unavoidable, the City will require applicants to mitigate the loss on a "no net loss" basis through a combination of avoidance, minimization, and/or compensation in accordance with federal and state law.
 - Policy Biological-3.4 If development or expansion of the Live Oak Park and Recreation
 Area on the Feather River occurs, the City will encourage designs, construction, and
 operation to protect sensitive riparian habitat.

Municipal Code

Section 12.04.030 of the municipal code, *Permit to Plant or Remove*, states that "no trees or shrubs shall be planted in or removed from any public utility strip or other place in the city without a permit from the superintendent of streets. (Ord. 88 § 3, 1957)".

A.3.7 Fish and Wildlife Resources

A.3.7.1 Sutter County

Yuba-Sutter Habitat Conservation Plan/Natural Community Conservation Plan

The Yuba-Sutter NCCP/HCP, currently under development, is a cooperative planning effort initiated by Yuba and Sutter Counties to address the effects of regional proposed transportation projects (SR 99 and SR 70) and any resulting development in the surrounding area. The purpose of the Yuba-Sutter NCCP/HCP is to provide a way to continue economic growth and community development; retain the economic vitality of the area's agricultural community; maintain public uses of open space; simplify and expedite land use and conservation planning in the plan area; protect threatened and endangered species; and preserve plant and wildlife communities.

Sutter County General Plan

The *Sutter County General Plan* update was initiated in fall 2007. The objective of the general plan is to provide guidance for the development of Sutter County. The general plan promotes a balance between strong agricultural traditions, natural resource preservation, and economic growth opportunities. The Environmental Resources chapter of the general plan was updated in 2010. The following goals, objectives, and policies are relevant to fish resources in the study area.

- **Goal ER 1:** Support a comprehensive approach for the conservation, enhancement, and regulation of Sutter County's significant habitat and natural open space resources.
 - ER 1.3 Conservation Efforts. Focus conservation efforts on areas identified as having very high and high habitat value as well as Sutter County's unique natural open space resources, including the Sutter Buttes, Sutter Bypass, Butte Sink, and the Sacramento, Feather, and Bear River corridors.
 - ER 1.5 Resources Assessment. Require discretionary development proposals that could
 potentially impact biological resources to conduct a biological resources assessment to
 determine if any resources will be adversely affected by the proposal and, if so, to identify
 appropriate measures to avoid or mitigate such effects.
 - **ER 1.6 Avoidance.** Ensure that new development projects avoid, to the extent feasible, significant biological resources (e.g., areas of rare, threatened or endangered species of plants, riparian areas, vernal pools), except where such projects are identified as —Authorized Development within an adopted Habitat Conservation Plan.
 - ER 1.7 Mitigation. Mitigate biological and open space effects that cannot be avoided in accordance with an applicable Habitat Conservation Plan and federal, state, and local regulations.
 - **ER 1.9 Buffers.** Ensure that new development incorporates buffers and other measures adequate to protect biological habitats that have been preserved, enhanced, and created.
- **GOAL ER 3:** Conserve, protect, and enhance Sutter County's varied wildlife and vegetation resources.
 - **ER 3.1 Special-Status Species.** Preserve special-status fish, wildlife, and plant species (e.g., rare, threatened, or endangered species) and habitats consistent with an applicable Habitat Conservation Plan and federal, state, and local regulations.

- ER 3.2 Agency Coordination. Coordinate with federal, state, and local resource agencies (e.g., California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) to protect special-status species.
- **ER 3.3 Fisheries.** Support the preservation and re-establishment of fisheries in the rivers and streams within Sutter County.
- **ER 3.6 Natural Vegetation.** Preserve important areas of natural vegetation and the ecological integrity of these habitats, where feasible, including but not limited to riparian, vernal pool, marshes, oak woodlands and annual grasslands (ER 3-A).
- ER 3.8 Native Plant Use. Encourage the use of native and drought tolerant plant materials, including native tree species, in all public and private landscaping and revegetation projects (ER 3-D).

A.3.7.2 Butte County

Butte County General Plan 2030

The Butte County General Plan 2030 (Butte County 2010) was adopted in October 2010. The objective of the general plan is to provide direction on how the county will fulfill its community vision and manage its future growth. The general plan addresses all aspects of development, including land use; circulation and transportation; open space, natural resources and conservation; public facilities and services; safety; and noise. The Conservation and Open Space Element chapter of the general plan was updated in 2010. The following goals, objectives, and policies are relevant to fish resources in the study area.

- **Goal COS-9:** Protect identified special-status plant and animal species.
 - COS-P9.1 A biological resources assessment shall be required for any proposed development project where special-status species or critical habitat may be present. Assessments shall be carried out under the direction of Butte County. Additional focused surveys shall be conducted during the appropriate season if necessary. Upon adoption of the Butte Regional Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP), assessment requirements of the [Butte Regional] HCP/NCCP shall be implemented for development projects within the [Butte Regional] HCP/NCCP area.
 - COS-P9.2 If special-status plant or animal species are found to be located within a development site, proponents of the project shall engage in consultation with the appropriate federal, State and regional agencies and mitigate project effects in accordance with State and federal law. Upon adoption of the Butte Regional Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP), mitigation requirements of the [Butte Regional]HCP/NCCP shall be implemented for development projects within the [Butte Regional]HCP/NCCP area.

Examples of mitigation may include:

- a. Design the proposed project to avoid and minimize effects.
- b. Restrict construction to specific seasons based on project specific special-status species issues (e.g. minimizing effects on special-status nesting birds by constructing outside of the nesting season).
- c. Confine construction disturbance to the minimum area necessary to complete the work.

- d. Mitigate for the loss of special-status species by purchasing credits at an approved conservation bank (if a bank exists for the species in question), funding restoration or habitat improvement projects at existing preserves in Butte County, or purchasing or donating mitigation lands of substantially similar habitat.
- e. Maintain a minimum 100-foot buffer on each side of all riparian corridors, creeks and streams for special-status and common wildlife.
- f. Establish setbacks from the outer edge of special-status species habitat areas.

A.3.8 Agriculture, Land Use, and Socioeconomics

A.3.8.1 Butte County

Butte County General Plan

The northern portion of Reach 25 through Reach 41 of the proposed project are located in unincorporated Butte County, and are subject to the goals and policies of the *Butte County General Plan*. Relevant goals and policies of the Agriculture Element follow.

- **Goal AG-1** Maintain, promote, and enhance Butte County's agriculture uses and resources, a major source of food, employment, and income in Butte County.
 - **Policy AG-P1.1** The County supports State and federal legislation designed to conserve soil and protect agricultural land.
 - **Policy AG-P1.3** Continue to work with landowners in establishing new and maintaining existing Williamson Act contracts.
- Goal AG-2 Protect Butte County's agricultural lands from conversion to non-agricultural uses.
 - Policy AG-P2.1 The county shall work with the Local Agency Formation Commission to create and maintain a consistent approach to the conservation of agricultural land through the designation of reasonable and logical sphere of influence boundaries.
 - Policy AG-P2.2 The County supports private conservation organizations that utilize voluntary conservation easements as a tool for agricultural conservation, continued agricultural use, agricultural supportive uses, tax breaks and similar goals.
- **Goal AG-6** Provide adequate infrastructure and services to support agriculture.
 - Policy AG-P6.1 The County supports the efforts of private landowners and public agencies to protect farmers from catastrophic and uncontrolled flooding of permanent crops, such as orchards, nurseries and other major agricultural investments.

Relevant goals and policies of the Land Use Element follow.

- **Goal LU-1** Continue to uphold and respect the planning principles on which the County's land use map is based.
 - o **Policy LU-P1.1** The County shall protect and conserve land that is used for agricultural purposes, including cropland and grazing land.
 - **Policy LU-P1.2** The County shall promote economic development and job-generating industry in unincorporated areas.

- o **Policy LU-P1.6** The County shall conserve important habitat and watershed areas, while protecting the public safety of County residents.
- **Goal LU-6** Provide adequate land for the development of public and quasi-public uses, as a means to provide necessary public services and facilities in support of existing and new residential, commercial, and industrial land uses.
- **Goal LU-12** Coordinate planning efforts within the county and region.
 - Policy LU-P12.4 The County shall coordinate planning efforts with those of special districts and school districts.

Relevant goals and policies of the Economic Development Element follow.

- **Goal ED-1** Improve the local economy by diversifying the economy, reducing the unemployment rate, increasing business revenues to the county, and increasing wages.
 - **Policy ED-P1.1** The County's priority for future growth is creating sustainable jobs and providing a living wage to families to reduce poverty.
 - Policy ED-P1.4 Products and services for County operations should be purchased from Butte County locally-owned businesses whenever possible.
 - Policy ED-P1.5 The County supports education and job training for those county residents currently employed, dislocated, or unemployed in order to enhance existing skill levels and provide for job advancement, and supports removal of impediments to gainful employment for county residents.
- **Goal ED-2** Promote and support the local agricultural economic sector.
 - Policy ED-P2.2 The County shall encourage development of food processing and other facilities that could support production of "value-added" agriculture products from Butte County.
- **Goal ED-3** Improve the county's fiscal health.

A.3.8.2 Sutter County

Sutter County General Plan

Project Reaches 2 through 10, part of Reach 11, and Reaches 14, 15, and 17 through the southern portion of Reach 25 lie within unincorporated Sutter County, and are subject to the goals and policies of the *Sutter County General Plan*. Relevant goals and policies of the Agriculture Element follow.

- **Goal AG 1** Preserve and protect high-quality agricultural lands for long-term agricultural production.
 - Policy AG 1.1 Agricultural Land Preservation. Preserve and maintain agriculturally
 designated lands for agricultural use and direct urban/suburban and other nonagricultural
 related development to the cities, unincorporated rural communities, and other clearly
 defined and comprehensively planned development areas.
 - o **Policy AG 1.5 Agricultural Land Conversion**. Discourage the conversion of agricultural land to other uses unless all of the following findings can be made:

- a. The net community benefit derived from conversion of the land outweighs the need to protect the land for long-term agricultural use
- b. There are no feasible alternative locations for the proposed use that would appreciably reduce impacts upon agricultural lands
- c. The use will not have significant adverse effects, or can mitigate such effects, upon existing and future adjacent agricultural lands and operations
- Policy AG 1.6 Interrelationship with Habitat Conservation. Permit agriculturally
 designated lands to be used for habitat conservation and/or mitigation with approval of a
 development agreement, provided such use does not interfere or adversely affect existing or
 planned agricultural uses or impact County flood control operations.
- Policy AG 1.9 Williamson Act. Promote the use of the California Land Conservation Act
 (Williamson Act) on agricultural lands throughout the County provided the State continues
 to fund the subvention program to offset the loss of property taxes.
- Policy AG 1.10 Transfer of Development Rights. Explore, and if determined feasible, implement programs to permanently preserve agricultural lands through the use of voluntary transfer of development rights to guide development to more suitable areas.
- Policy AG 1.11 Conservation Easements. Explore, and if determined feasible, identify
 agricultural mitigation bank areas in which the County will encourage private landowners to
 voluntarily participate in agricultural conservation easements.
- Policy AG 1.12 Land Mitigation Program. Explore, and if determined feasible, create an Agricultural Land Mitigation Program.
- O Policy AG 1.13 Cooperation with Other Agencies. Coordinate with the cities, the Local Agency Formation Commission (LAFCO), local service providers, and other relevant agencies on joint mechanisms to preserve agricultural lands and limit urban encroachment and the extension of urban service and infrastructure into agricultural areas.
- **Goal AG 2** Minimize conflicts between agricultural uses and operations and adjacent non-agricultural uses.
 - o **Policy AG 2.1 Minimize Conflicts.** Require that new development adjacent to agricultural areas be designed to minimize conflicts with adjacent agricultural uses and operations.
 - O Policy AG 2.2 Right to Farm. Affirm and protect the right of agricultural operators in agricultural areas to continue their agricultural practices ("right to farm"). The right to farm shall acknowledge through noticing that landowners and residents adjacent to agriculture should be prepared, accept, and not consider a nuisance the impacts inherent with lawful farming activities. At a minimum, the Right to Farm Notice shall be recorded with the Deed of Trust at the time of transfer of all applicable properties.
 - Policy AG 2.3 Buffers. Protect agricultural operations from conflicts with non-agricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations:
 - a. Buffers should be physically and biologically designed to avoid conflicts between agricultural and nonagricultural uses. The biological design should ensure that the buffer does not provide a host environment for pests or carriers of disease which could potentially impact adjacent farming operations.

- b. Buffers shall not be located on the agricultural parcel(s).
- c. Buffers should primarily consist of a physical separation (setback) between agricultural and non-agricultural uses. The appropriate width of the buffer shall be determined on a site-by-site basis taking into account the type of existing agricultural uses (i.e. crop type and associated operational requirements); the nature of the proposed non-agricultural development; the natural features of the site; landscaping, walls or other barriers planned by the proposed development; and any other factors that affect the specific situation.
- d. In addition to a physical separation, the following buffer options may be considered: greenbelts/open space, limited park and recreation areas, roads, PUE's, waterways, and vegetative screens. These buffering options may be used in any combination to most effectively reduce conflicts arising from adjacent incompatible uses.
- e. An ongoing maintenance program for the buffer shall be established and should include vector controls.
- f. Buffer restrictions may be removed if all adjacent parcels have been irreversibly converted to nonagricultural uses.
- **Goal AG 3** Protect the natural resources needed to ensure that agriculture remains an essential and sustainable part of Sutter County's future.
- Goal AG 4 Provide for growth, expansion, and diversification of Sutter County's agricultural industries.
 - Policy AG 4.1 Transportation Systems. Maintain existing regional transportation systems to support the local, national, and global movement of agricultural products. Support the extension of freight rail into Sutter County's industrial areas.
 - Policy AG 4.2 Utility Infrastructure. Implement mechanisms to provide the utility infrastructure, flood protection, and services necessary to lands designated for industrial use in order to support the growth and expansion of Sutter County's agriculture industries.
 - Policy AG 4.5 Agricultural Industries. Promote the growth and expansion of existing agricultural industries as well as the development of new and diverse agricultural production, processing, and distribution industries within Sutter County.
 - Policy AG 4.6 Local Processing. Support the local processing and distribution of agricultural products grown in Sutter County and other nearby locations.

Relevant goals and policies of the Land Use Element follow.

- **Goal LU 1** Promote the efficient and sensitive use of lands to protect and enhance Sutter County's quality of life and meet the needs of existing and future residents and businesses.
 - Policy LU 1.2 Balanced Land Use Pattern. Maintain a balance of land uses that allows residents the opportunity to live, work, and shop in the County.
 - Policy LU 1.4 Identification of Floodplains. Identify the unincorporated areas of Sutter County that are subject to flooding, and evaluate and regulate development within these areas according to state and federal regulations to minimize the loss of life and damage to property caused by potential flood events.

- Policy LU 1.5 Minimize Land Use Conflicts. Avoid/minimize conflicts between land uses and ensure that new development maintains the viability of adjacent agricultural, open space, and rural uses and minimizes impacts upon existing residents, businesses, and resources.
- Policy LU 1.6 Buffers. Require new development adjacent to agricultural and open space lands to provide buffers and incorporate mitigation to minimize impacts as appropriate. Agricultural buffers shall be in accordance with the Sutter County Design Guidelines and project environmental review.
- o **Policy LU 1.7 Growth Inducement.** Locate and size infrastructure to not induce growth within adjacent agricultural and open space areas.
- Policy LU 1.11 Efficient Land Use Patterns. Encourage land use patterns that support the
 efficient use of resources, enhance the timely provision of services and infrastructure,
 promote a variety of transportation modes, facilitate pedestrian mobility, and support
 health and wellness.
- Goal LU 2 Preserve Sutter County's agricultural heritage and natural resources.
 - Policy LU 2.1 Long-Term Conservation. Promote the long-term conservation of agricultural and open space lands in accordance with the goals and policies of the Agricultural Resources and Environmental Resources elements.
 - Policy LU 2.2 Isolated Urban and Rural Uses. Prohibit the designation of new, and the
 expansion of existing, isolated rural or urban land uses within agricultural or other resource
 lands, unless such expansion is compatible with the existing use.
 - O Policy LU 2.5 Commercial Recreation Overlay. Allow for the allocation of the Commercial Recreation Overlay land use designation within, or "inside" the levees along the Sacramento, Feather, and Bear River corridors. Consider allocation of this land use designation to adjacent areas "outside" the levees when determined to be necessary for the proposed use and if the use will not have an adverse impact on adjacent agricultural operations or natural resources.
- **Goal LU 4** Facilitate orderly, well-planned, sustainable, and efficient growth that balances aesthetic, functional, resource, and economic considerations.
 - **Policy LU 4.1 Growth Areas.** Direct future growth and development to the growth areas identified on Figure 3-1.
 - o **Policy LU 4.6 Discontiguous Development.** Prohibit the establishment of new growth areas that are separated from existing cities and/or rural communities.
- **Goal LU 5** Promote a collaborative process for the planning and annexation of the area within the cities spheres of influence.
 - o **Policy LU 5.1 Live Oak SOI.** Recognize the sphere of influence identified on the General Plan Land Use Diagrams as Live Oak's boundary of future planned urban growth.
 - Policy LU 5.2 Yuba City Existing SOI. Recognize the existing sphere of influence identified on the General Plan Land Use Diagrams as Yuba City's boundary of future planned urban growth.

- Policy LU 5.3 Yuba City Possible Future SOI. Consider the possible future expanded sphere of influence identified on the General Plan Land Use Diagrams as Yuba City's possible boundary of future planned urban growth. Enter into a memorandum of understanding (MOU) with Yuba City prior to supporting the City's possible future expanded sphere of influence.
- O Policy LU 5.4 Sphere Expansion. Discourage the modification or expansion of Yuba City's and Live Oak's spheres of influence beyond the boundaries identified (including the possible future expanded Yuba City sphere of influence) on the General Plan Land Use Diagrams until substantial build out has occurred within the existing spheres, and a clear market demand exists for new uses that cannot be more efficiently accommodated in other defined growth areas in the County.
- Goal LU 9 Designate adequate and compatible sites for governmental/public uses, and take a lead role when feasible on regional issues of importance to Sutter County, its residents, and businesses.
 - Policy LU 9.1 Co-Location. Promote the co-location of parks, schools, police, fire, libraries, community centers and other community facilities to support community interaction, enhance neighborhood identity, support joint use, and leverage resources.
 - Policy LU 9.4 Impacts to Nearby Uses. Require public facilities such as wells, pumps, tanks, and yards to be located and designed to ensure that noise, light, odors, and appearance do not adversely affect nearby land uses.
 - Policy LU 9.5 Regional Planning Efforts. Support and participate as appropriate in countywide, regional, and other multi-agency planning efforts related to land use, housing, revenue, economic development, tourism, agriculture, natural resources, air quality, habitat conservation, transportation, transit, infrastructure, water supply, flood control, solid waste disposal, emergency preparedness, and other issues relevant to the County.
 - Policy LU 9.7 Project Consultation. Encourage early consultation with adjacent jurisdictions on development proposals in Sutter County that may have an impact to them. Respond to and comment on development proposals in other jurisdictions that may have an impact to Sutter County to ensure consistency with the County's General Plan and that appropriate mitigation is incorporated.

Relevant goals and policies of the Economic Development Element follow.

- Goal ED 1 Maintain and enhance the County's long-term fiscal health.
- Goal ED 2 Maintain a business-friendly environment for both existing and new companies.
 - Policy ED 2.1 Infrastructure for New Business. Ensure the provision of adequate infrastructure for business development, including flood control, road and rail networks, telecommunications backbone, sewer, drainage facilities, and water supply.
 - Policy ED 2.6 Interjurisdiction Coordination. Create alliances with local jurisdictions and agencies to promote economic growth within the county.
- **Goal ED 3** Enhance the desirability of the County for new business and business expansion by supporting investment in the professional skills of the work force.
 - o **Policy ED 3.1** Stable Jobs. Encourage future growth that creates stable jobs.

• **Policy ED 3.2** Financial Independence. Support economic opportunities that promote the self-sufficiency of residents and reduce dependence on County programs and services.

City of Yuba City

Yuba City General Plan

The *Yuba City General Plan* outlines land use and zoning policies for the area within the Yuba City limits. Although Reaches 11 through 18 of the proposed project skirt the eastern boundary of Yuba City, the project site lies, with three exceptions, within unincorporated Sutter County. These exceptions are the northernmost portion of Reach 11, Reach 16, and the southernmost portion of Reach 17, which fall within Yuba City limits.

Relevant policies of the Agriculture Element follow.

- o **Policy 8.2-G-1** Promote preservation of agriculture outside of the urban growth area.
- O Policy 8.2-I-1 Work with the County to preserve agricultural uses in areas outside the Urban Growth Boundary and within greenbelts established around the exterior of the UGB. The City should work with Sutter County to encourage the continuation of farming activities outside the City's and Urban Growth Boundary. Programs such as conservation easements and Williamson Act contracts should be pursued.
- Policy 8.2-I-2 Facilitate the continuance of agricultural activities within the City's urban growth area until the land is needed to accommodate population and employment growth.
 During this interim, minimize conflicts between agricultural uses and urban/suburban uses through site design techniques (not necessarily structural barriers).
- Policy 8.2-I-5 Work with the Economic Development Corporation to assist proponents in continued and new agricultural processing uses in the proposed industrial area in order to support agricultural activities in the County.
- Policy 8.2-I-6 Work with government agencies and non-profit land trusts to assist owners
 of undeveloped lands (sufficient in size to allow continued agricultural uses) to remain in
 agricultural open space on the perimeter of the urban growth area. Potential programs may
 include purchase of conservation easements or creation of agricultural land trusts.

Relevant policies of the Land Use Element follow.

- **Policy 3.4-I-2** Establish standards for urban edges and ensure that designated intensities and uses provide an appropriate transition to rural land at these edges.
- o **Policy 3.4-1-4** Support the County's efforts to maintain viable agricultural uses surrounding the city in areas outside the proposed Urban Growth Boundary.
- o **Policy 3.9-G-5** Protect the supply of land suitable for employment center uses by not allowing incompatible uses to locate in these areas.

Relevant policies of the Growth and Economic Development Element follow.

 Policy 2.5-G-1 Foster a climate in which business can prosper and actively promote economic development opportunities and knowledge of Yuba City in the region, state and nation.

- Policy 2.5-G-5 Encourage agricultural processing and cooperative distribution and marketing of agricultural products.
- Policy 2.5-G-6 Promote agricultural-related technology and opportunities for "back office" uses and specialty manufacturing.
- Policy 2.5-G-7 Enhance aspects of the community that help economic development and draw residents to Yuba City, including small-town ambience, educational, cultural, environmental and recreational resources, and affordable housing.

City of Live Oak

City of Live Oak 2030 General Plan

The FRWLP project area lies approximately 1mile east of the Live Oak City limit, but portions of Reaches 22 through 25 fall within the City of Live Oak SOI. The SOI, as designated in the *City of Live Oak 2030 General Plan*, represents the city's probable ultimate physical boundary. Accordingly, the following goals and policies may apply to implementation of the proposed project.

The relevant goal and policies from the Agriculture Element follow.

- **Goal Agriculture-1** Preserve agricultural resources and support the practice of farming.
 - Policy Agriculture-1.1 Preserve agricultural enterprises by supporting right-to-farm policies.
 - Policy Agriculture-1.3 As a part of the City's economic development strategy, the City will
 focus on efforts to attract industries related to, and supportive of, the local agricultural
 economy.
 - Policy Agriculture-1.5 The City will work with farmers, property owners, extensions, agencies, and agricultural organizations to enhance the viability of agricultural uses and activities.

The relevant goal of the Land Use Element follows.

Goal LU-5 Establish environmentally and economically sustainable land-use patterns.

Relevant goals and policies of the Economic Development Element follow.

- **Goal ED-3** Attract and develop new employment uses in Live Oak that can provide jobs for local workers, enhance the City's tax base, and diversify the local economy.
 - Policy ED-3.2 The City will coordinate with Sutter County to ensure a mutual City-County benefit from agricultural processing plants that locate near Live Oak.
 - o **Policy ED-3.3** The City will identify and proactively engage agricultural service businesses that could locate in Live Oak and support nearby agricultural processing and sales.
 - Policy ED-3.6 The City will target attracting the types of industries that are not only suited to the assets offered by Live Oak's location, but also industries that will provide viable career ladders for local workers, from entry level through management positions.
- **Goal ED-5** Foster growth and expansion among existing businesses in the community as a primary strategy for improving the economic health of the City.

A.3.9 Population, Housing, and Environmental Justice

A.3.9.1 Butte County

Butte County General Plan 2030

The relevant goals and policies of the Housing Element of the *Butte County General Plan 2030* are listed below.

- **Goal H-1:** Provide for the County's regional share of new housing for all income groups and future residents as identified in the Housing Needs Assessment.
- **Goal H-2:** Encourage the provision of affordable housing in the unincorporated area.
- **Goal H-3:** Partner with property owners to preserve and rehabilitate the existing supply of housing.
- **Goal H-4:** Collaborate with existing service providers to meet the special housing needs of homeless persons, elderly, large families, disabled persons, and farmworkers.
- **Goal H-5:** Ensure equal housing opportunity.
- **Goal H-6:** Promote energy conservation.

City of Biggs

City of Biggs General Plan

The relevant goals and policies of the City of Biggs General Plan Housing Element 2009–2014 (Pacific Municipal Consultants 2010) are listed below.

- Goal 1—Housing Quality: Provide an adequate supply of housing which is affordable, safe, sanitary, and desirable for all segments of the community. Housing should be of sufficient quality and quantity to afford all persons regardless of race, age, religion, sex, marital status, ethnic background, or personal disabilities an opportunity of selecting among varying types, designs, quality and value.
- **Goal 2—Housing Quantity and Affordability**: It is the goal of the City of Biggs to encourage the preservation of existing housing and the construction of new housing at a range of costs and in quantities to meet the needs of existing and future residents of the City.
- **Goal 3—Equal Housing opportunity**: It is the goal of the City of Biggs to assure that discrimination is not a factor in the ability of households to obtain housing.
- **Goal 4—Natural Resources and Energy Conservation**: It is the goal of the City to promote the conservation of natural resources and energy in housing production.

City of Gridley

City of Gridley 2030 General Plan

The relevant goals of the City of Gridley 2030 General Plan Housing Plan are listed below.

• **Housing Goal 1:** To promote the development of a variety of housing types throughout the city that are safe and built to complement the surrounding neighborhood.

- **Housing Goal 2:** To facilitate the preservation and construction of housing to meet the needs of Gridley residents, including all household types and incomes.
- **Housing Goal 3:** To reduce and remove constraints to development and redevelopment of housing.
- Housing Goal 4: To promote development and redevelopment of affordable housing.
- **Housing Goal 5:** To ensure equal opportunity and access to housing for all residents.
- **Housing Goal 6:** To reduce household costs and conserve natural resources and energy in housing production.

A.3.9.2 Sutter County

Sutter County General Plan

The applicable goals and policies of the Sutter County General Plan Housing Element are listed below (Sutter County 2010:5-19 to 5-20).

- **Goal 1:** Remove governmental constraints, address accessibility needs, and provide a regulatory framework to encourage a variety of housing types that accommodate all income groups.
- **Goal 2:** Provide for an adequate supply of new housing to meet the needs of present and future Sutter County residents, incorporating a variety of housing types and densities that accommodate all income groups, including extremely low-income households.
- **Goal 3:** Provide opportunities for agricultural housing while preserving rural land for agricultural uses.
- **Goal 4:** Ensure that new housing in Sutter County is safe and sanitary and that it receives public services that are adequate to support the level of development.
- **Goal 5:** Conserve and improve existing housing in Sutter County to ensure safe and sanitary conditions.
- **Goal 6:** Support the Consolidated Area Housing Authority of Sutter County and other nonprofit and private affordable housing providers in the County.

City of Yuba City

Yuba City Housing Element Update

The City of Yuba City's policies on housing provided in its housing element update (2008–2013) (Stuart and Graham 2009: 56, 57, 63, 65, 71) are listed below.

- **H-A:** Provide incentives and programs to ensure the construction and maintenance of safe and sanitary housing with adequate public services for existing and future residents of the City.
- **H-B:** Provide incentives and programs to ensure the provision of very low, low, and moderate income housing units to meet community needs.
- **H-C:** Continue to work with Sutter County on actions to fulfill Yuba City's fair share of regional housing needs.
- **H-D:** Ensure that new housing will be safe and sanitary and in a livable environment with adequate public services for the level of development.

- **H-E:** Facilitate the production of various housing types and densities to meet the needs of all income groups and ensure that housing opportunities are open to all without regard to race, color, age, sex, religion, national origin, family status, or physical handicap.
- **H-F:** Encourage the use of energy efficient materials and technology in new construction.

City of Live Oak

City of Live Oak 2030 General Plan

The relevant goals and policies of the *City of Live Oak 2030 General Plan* Housing Element are listed below.

- Goal A: To accommodate the City's share of the Regional Housing Need.
- **Goal B:** Provide for a variety of housing opportunities and affordability levels within the City of Live Oak.
- **Goal C:** Encourage and assist in the rehabilitation of housing units in need of repair and occupied by extremely low-, very low-, and low-income residents. Strive to enhance the overall quality of the City's existing housing stock.
- Goal D: Preserve, and if necessary replace, the City's publicly assisted affordable housing.
- **Goal E.1:** Ensure that no person seeking housing in the City of Live Oak is discriminated against on the basis of race, color, religion, sex, disability, familial status, ancestry, national origin, ancestry, marital status, sexual orientation, source of income, or age.
- **Goal F.1:** To promote energy conservation.

A.3.10 Visual

A.3.10.1 Butte County

Butte County General Plan 2030

The Butte County General Plan 2030 (Butte County 2010) establishes the Thermalito Afterbay as a Water-Based Scenic Area. There are no other county-designated Land- or Water-Based Scenic Areas in the project area. Relevant goals and policies of the Water Resources Element, Conservation and Open Space Element, and Public Facilities and Services Element are listed below.

- **Goal W-6**: Improve streambank stability and protect riparian resources
 - W-P6.1 Any alteration of natural channels for flood control shall retain and protect riparian vegetation to the extent possible while still accomplishing the goal of providing flood control. Where removing existing riparian vegetation is unavoidable, the alteration shall allow for reestablishment of vegetation without compromising the flood flow capacity.
- **Goal COS-16**: Respect Native American culture and planning concerns.
 - COS-P16.2 Impacts to the traditional Native American landscape shall be considered during California Environmental Quality Act or National Environmental Policy Act review of development proposals.

- o **COS-P17.1** Views of Butte County's scenic resources, including water features, unique geologic features and wildlife habitat areas, shall be maintained.
- Goal PUB-8: Coordinate an interconnected multi-use trail system.
 - **PUB-P8.3** The development of abandoned railroad rights-of-way, levee tops, utility easements and waterways for new multi-use trails shall be pursued where appropriate.

A.3.10.2 Sutter County

Sutter County General Plan

Signs are located along North Buttes Road indicating the North Buttes Scenic Route. This route, however, is not included in the Sutter County General Plan (Sutter County 2011) as a county-designated scenic route. The Sutter County General Plan contains the following policies related to visual resources.

Related policies of the Land Use Element are listed below. The policy concerning countywide land use is as follows.

• **LU 1.16** Views from Rural Roadways and Highways. Prohibit new projects and activities that would obscure, detract from, or negatively impact the quality of views from the County's rural roadways and highways. Limit off-site advertising along County roadways and highways. (*LU 1-B*)

The policies concerning agriculture and open space are shown below.

- **LU 2.5** Commercial Recreation Overlay. Allow for the allocation of the Commercial Recreation Overlay land use designation within, or "inside" the levees along the Sacramento, Feather, and Bear River corridors. Consider allocation of this land use designation to adjacent areas "outside" the levees when determined to be necessary for the proposed use and if the use will not have an adverse impact on adjacent agricultural operations or natural resources. (*LU 2-A/LU 2-B*)
- **LU 2.6** Rural Character. Ensure the density, intensity, and design of new development within agricultural areas is consistent with and maintains the County's rural/agricultural character. (LU 1-B)

The policy concerning rural communities is shown below.

• **LU 3.8** Landmarks and Resources. Preserve and protect local landmarks and significant natural resources within rural communities. (LU 1-B/LU 3-A)

One policy of the Agricultural Resources Element relates to visitor services (agri-tourism).

• **AG 5.4** Recreational Uses. Support recreational uses on privately owned lands where such uses are compatible with on and off-site agriculture and with scenic and environmentally sensitive resources. (AG 1-A)

Several policies of the Environmental Resources Element related to biological resources and open space.

• **ER 3.6** Natural Vegetation. Preserve important areas of natural vegetation and the ecological integrity of these habitats, where feasible, including but not limited to riparian, vernal pool, marshes, oak woodlands and annual grasslands. (ER 3-A)

- **ER 3.7** Oak Trees. Preserve native oak trees when possible through the review of discretionary development projects and activities. Reduce the loss of oak trees through consideration of tree mitigation/replanting programs. (ER 3-B/ER 3C)
- **ER 4.1** Preserve Natural Resources. Preserve natural landforms, natural vegetation, and natural resources as open space to the extent feasible.
- **ER 4.3** River Corridors. Preserve the Sacramento, Feather, and Bear River corridors as important habitat, recreation and open space resources. Support efforts to increase public access and recreational uses along the County's river corridors.

Other policies of the Environmental Resources Element concern visual resources.

- **ER 7.1** Scenic Resources. Protect views of Sutter County's unique scenic resources including the Sutter Buttes, wildlife and habitat areas, the Sacramento, Feather, and Bear Rivers, and other significant resources. (*ER 7-A*)
- **ER 7.2** Scenic Roadways. Enhance the visual character along the County's key transportation corridors, in particular Highways 99 and 20, through application of consistent design and landscape standards. (*ER 7-B*)
- **ER 7.3** Visually Complimentary Development. Require new development adjacent to the County's scenic resources to be sited and designed to visually complement the natural environment, topography, and aesthetic viewsheds. (*ER 7-A*)
- **ER 7.5** Lighting. Support practices that reduce light pollution and preserve views of the night sky including the design and sighting of light fixtures to minimize glare and light on adjacent properties. (ER 7-A)

City of Yuba City

The City of Yuba City General Plan (City of Yuba City 2004) contains the following Growth and Economic Development policy related to visual resources.

• **Guiding Policy 2.5-G-7** Enhance aspects of the community that help economic development and draw residents to Yuba City, including small-town ambience, educational, cultural, environmental and recreational resources, and affordable housing.

Community Design

Sutter Street/Second Street

• **Implementing Policy 4.4-I-10** Provide signage, landscaping, lighting, and other visual features to emphasize the existing and planned pedestrian access to the riverfront.

Parks, Schools, & Community Facilities

The general plan references the 2002 *Feather River Parkway Strategic Plan* that was developed to make use of the existing open space along the river that

is visually inaccessible due to the existing levee. Proposed uses include a trail system, beaches, river viewing pavilions, boating facilities, and active recreational facilities, such as a golf course. The plan also addresses issues of waterfront accessibility, park space creation, and connections between the waterfront and Yuba City.

- **Implementing Policy 6.1-I-10** Implement the Feather River Parkway Strategic Plan in a manner consistent with the plans and programs put forth in that document and consistent with policies in the Open Space and Conservation Chapter (Chapter 8). Proposed actions include:
 - Improve pedestrian access to the riverfront;
 - Provide a mix of active- and non-active recreational and open space in those areas delineated in the Feather River Parkway Strategic Plan; and
 - Ensure that the open spaces proposed in the Feather River Parkway Strategic Plan be designed in a manner flexible enough to accommodate a variety of activities.

Environmental Conservation

Open Space

- **Guiding Policy 8.1-G-2** Enhance the open space features of the Feather River.
- **Guiding Policy 8.1-G-3** Preserve and enhance the visual and scenic resources of the Planning Area.
- Implementing Policy 8.1-I-1 Coordinate with Sutter County in the creation of a greenway/open space buffer around the perimeter of the City's urban growth area. Explore regulatory incentives (e.g., Williamson Act) and financing mechanisms necessary to ensure preservation of these lands as open space.
- **Implementing Policy 8.1-I-3** Work with public and private entities to implement open space features of the Feather River Parkway Plan.
- **Implementing Policy 8.1-I-4** Where feasible, encourage restoration of degraded open space areas in the Feather River Parkway planning area to an environmentally valuable and sustainable condition.

Biological Resources

- **Guiding Policy 8.4-G-2** Protect and enhance the natural habitat features of the Feather River and new open space corridors within and around the urban growth area.
- **Guiding Policy 8.4-G-3** Preserve and enhance heritage oaks in the Planning Area.
- **Implementing Policy 8.4-I-2** Require preservation of oak trees and other native trees that are of a significant size, by requiring site designs to incorporate these trees to the maximum extent feasible.

City of Live Oak

City of Live Oak 2030 General Plan

The City of Live Oak 2030 General Plan (City of Live Oak 2010) contains the following policies related to visual resources. One policy concerns community character.

- **Policy Design 3.1** Important visual gateways should be designed to:
 - o Provide an attractive streetscape environment for visitors;
 - o Preserve vegetation and add new landscaping to enhance aesthetics;

- o Preserve or enhance views of the Sutter Buttes, where possible;
- o Visually "announce" to the visitor their arrival in Live Oak and the downtown core area; and
- Have attractive civic landmarks and public spaces.

Other policies relate to conservation and open space. Specifically, the following policies concern biological resources.

- Policy Biological 3.1 Where feasible, the City will require that new developments avoid the conversion of existing riparian habitat and require that an adequate buffer of the associated riparian areas be established to protect this resource. Where feasible, the riparian buffers shall be incorporated into open space corridors, public landscapes, and parks. Riparian buffers shall be designed to preserve existing wildlife habitat; restore degraded habitat; provide habitat conditions favorable to native local wildlife; restrict activities that may adversely affect wildlife habitat quality within the established buffer zone; and provide interpretive features educating the public about the beneficial effects of native riparian habitat and activities that adversely affect wildlife.
- **Policy Biological 3.2** The City will take advantage of opportunities to enhance and restore existing riparian areas along Live Oak Slough and other drainage canals. Where feasible, these resources shall be incorporated into open space corridors, public landscapes, and park during the preparation of the Parks and Recreation Master Plan.
- **Policy Biological 3.4** If development or expansion of the Live Oak Park and Recreation Area on the Feather River occurs, the City will encourage designs, construction, and operation to protect sensitive riparian habitat.

The following policy concerns drainage and flood protection.

• **Policy Public 5.3** Existing Reclamation District 777 and Reclamation District 2056 drainage channels should be improved, to the greatest extent feasible, to create more naturalized swales that provide stormwater conveyance. These channels should be restored with native, low-maintenance landscaping to filter stormwater and enhance neighborhood aesthetics.

The following policy concerns parks and recreation.

 Policy Parks 4.2 The City will coordinate with the other cities and the county to plan for improvements at Live Oak Park and Recreation Area to support and complement future trails along the Feather River.

A.3.11 Recreation

A.3.11.1 Butte County

Butte County General Plan 2030

The Butte County General Plan 2030 establishes several goals, policies, and actions affecting recreation including bicycle and park facilities (Butte County 2010:191). These appear in the Circulation Element and the Public Facilities and Services Element.

• **Goal CIR-1:** Promote intergovernmental communication and cooperation concerning transportation-related issues.

- **Goal CIR-3:** Design new neighborhoods, and improve existing neighborhoods, to accommodate and promote alternative modes of transportation.
- **Goal CIR-5:** Provide a safe, continuous, integrated, and accessible bicycle system, so as to encourage the use of the bicycle as a viable transportation mode and as a form of recreation and exercise.
- **Goal CIR-9:** Provide a circulation system that supports public safety.
- **Goal PUB-6:** Support a comprehensive and high-quality system of recreational open space and facilities.
- **Goal PUB-7:** Encourage local, regional, and State parks providers to engage in coordinated and cooperative planning efforts.
- **Goal PUB-8:** Coordinate an interconnected multiuse trail system.
 - Policy PUB-P8.1 The County shall work with the municipalities and park and recreation districts to connect between trails in incorporated and unincorporated regions of Butte County.
 - Policy PUB-P8.2 The County shall work with local jurisdictions, Lassen and Plumas
 National Forests, the Department of Water Resources, and the Department of Fish and Game
 to designate additional shared use trails along unpaved County roads, access roads, and fire
 roads.
 - o **Policy PUB-P8.3** The development of abandoned railroad rights-of-way, levee tops, utility easements, and waterways for new multiuse trails shall be pursued where appropriate.
 - Policy PUB-P8.4 The County supports development of additional equestrian trails, including safe routes along roads.
 - o **Policy PUB-P8.5** The County supports development of additional off-road vehicle trails.
 - Policy PUB-P8.6 The County supports acquisition of appropriate and adequate funding for the creation and ongoing maintenance of trails.
 - Policy PUB-P8.7 New development shall incorporate multiuse trails and connections to existing trail networks.
 - Action PUB-A8.2 Cooperate with appropriate agencies to conduct a countywide trails
 planning study to identify new needed routes and connections to the existing trails
 network, as well as to address funding and management of trail facilities.

Countywide Bikeway Master Plan

Butte County adopted its Countywide Bikeway Master Plan in 1998 and is updating this plan (Butte County 2010:177). The Countywide Bikeway Master Plan identifies the following goals, objectives, and policies affecting recreation (Butte County 1998:39):

- **Goal 1:** Provide continuous and convenient bicycle access to and between major destinations throughout the County.
 - o **Objective:** Develop a bikeway program that identifies interregional bikeway needs.
 - **Policy** Identify and give funding priority to projects which connect existing regional bikeway facilities.

- **Policy** Encourage linkages between local bikeways to regional bikeways.
- **Policy** Promote bikeway linkages to regional educational, recreational, shopping, governmental, and other attractions.
- **Goal 2:** Provide a safe and efficient bikeway system.
- **Goal 3:** Promote bicycling as a part of the intermodal transportation system.
- **Goal 5:** Develop a bikeway system that encourages and facilitates commuter use.
- Goal 6: Develop a bikeway system that encourages and facilitates recreational use.
 - Objective: Encourage recreational bicycling by providing a bikeway system that responds to the riding needs of both the avid cyclist and the "weekend" rider.
 - Policy Emphasize connections to regional recreational centers, such as Lake Oroville and Bidwell Park.
 - **Policy** Provide adequate bicycle parking facilities at regional recreation areas where warranted by demand.
- **Goal 7:** Pursue and obtain maximum funding available for bikeway programs.

City of Gridley

City of Gridley 2030 Master Plan

The City of Gridley 2030 General Plan establishes a policy of achieving and maintaining a standard of 5 acres of park land per 1,000 population (City of Gridley 2010:10-22). The Circulation Element and the Open Space Element in the general plan contain several goals, policies, and programs affecting recreation including bicycle and park facilities (City of Gridley 2010:7-19).

- **Circulation Goal 1:** To ensure that new development accommodates safe and pleasant routes for pedestrians, bicyclists, and drivers.
 - Circulation Implementation Strategy 1.3 The City will update the Bicycle Plan to incorporate the Planned Growth Area and implement policies of the updated 2030 General Plan. The City will incorporate connections to existing and planned regional pedestrian/bicycle routes shown on plans adopted by Butte County. The City will provide potential connections with the City of Biggs and will incorporate planned connections shown on plans adopted by the City of Biggs. The City will consult with BCAG, the County, Butte County Air Quality Management District, and other agencies to obtain funding for improvements described in the Bicycle Plan.
- **Circulation Goal 2:** To retrofit existing development for increased pedestrian, bicycle, and transit access.
- **Open Space Goal 1:** To create high-quality, functional open space corridors.
- **Open Space Goal 2:** To provide visual screening, buffering, trails, and drainage in open space corridors along the railroad and Highway 99 in the Planned Growth Area.
- **Open Space Goal 3:** To provide for drainage, pedestrian and bicycle circulation, and landscaping in open space corridors within neighborhoods.

- **Open Space Goal 4:** To ensure adequate outdoor recreational open space to meet local needs as the City grows.
 - **Open Space Policy 4.1** New developments shall provide for improved, public park land according at a minimum rate of 5 acres per 1,000 residents.
- Open Space Goal 5: Maintain, expand, and upgrade facilities in existing recreation areas.
 - Open Space Policy 5.6 The City will explore opportunities to improve ongoing public access to, and expand recreational opportunities related to the Feather River on property owned by the City and used for wastewater treatment.
 - Open Space Implementation Strategy 5.1 The City will promote awareness of regional, state, and private parks and recreation planning and facilities development near Gridley, such as Grey Lodge, Lake Oroville Recreation Area, or new facilities. The City will encourage development of uses and facilities within Gridley that would be complementary to these regional recreation opportunities, in order to take best local advantage of these resources. The City will coordinate signage to promote awareness of these regional facilities.
- **Open Space Goal 6:** To provide recreation facilities and programs that meet the needs of existing and future residents.

City of Gridley Bicycle Plan

The City of Gridley Bicycle Plan identifies goals, objectives, and measures for developing a bicycle circulation network that ties into the region beyond the City and provides access to the Gray Lodge Wildlife Area, the City of Biggs, and the Feather River. The plan establishes several goals, objectives, and implementation measures affecting recreation facilities for bikes (City of Gridley 2003:16).

- Goal: A safe, effective, and efficient bicycle circulation system
 - o **Implementation Measure 3.1:** Participate and comment on the Butte County Bicycle Plan update as it relates to Gridley-area routes, namely access to Feather River along East Gridley Road, and bikeways to Biggs and Gray Lodge Wildlife Area.

A.3.11.2 Sutter County

Sutter County General Plan

Sutter County does not have a park and recreation department and does not provide recreational facilities or opportunities through County programs under such a public agency (Sutter County 2011:8-1). The County does collect developer fees for parks and allocates the fees to one of five sectors. The fees are collected for recreation capital improvements (Sutter County 1996b:7.3). The Sutter County General Plan establishes a policy of achieving and maintaining a standard of 10 acres of park land per 1,000 population (Sutter County 2011:8-7). The plan identifies the following goals and policies affecting recreation, including bicycle and park facilities (Sutter County 2011:8-7–8-9).

- **Goal PS 6:** Ensure that adequate park, recreation, and open space lands and programs are provided to meet the diverse needs of Sutter County's residents.
 - Policy PS 6.1 Park Facilities. Support the development of new parks and recreational
 facilities, and the maintenance and enhancement of existing parks and recreational facilities,
 to provide for a variety of active and passive recreational needs.

- Policy PS 6.2 Countywide Parks and Open Space Standard. Strive to achieve and maintain a standard of 10 acres per 1,000 residents of park and open space lands within the County.
- O Policy PS 6.3 Parks and Open Space Standard for New Large-Scale Development.

 Require new large-scale development projects (i.e., Specific Plans, Rural Planned
 Communities) to provide 10 acres per 1,000 residents of active and passive parks and open
 space lands. New large-scale development projects shall prepare and implement a County
 approved Parks and Open Space Master Plan.
- Policy PS 6.6 Access. Locate new parks and recreation facilities within walking and bicycling distance of residential areas.
- Policy PS 6.10 River Recreation. Support the development of public recreational amenities
 that enhance public access to and use of the Sacramento, Feather, and Bear River corridors
 including launch ramps, marinas, camping facilities, picnic areas, vista points, interpretive
 centers, and commercial recreation and services.
- o **Policy PS 6-B** Revise the Zoning Code to allow for and facilitate recreation, commercial recreation, service and related uses along the County's river corridors.
- **Goal PS 7:** Support creation of an interconnected multi-use trail system that enhances Sutter County's recreational opportunities.
 - Policy PS 7.1 Multi-Use Trails. Support the development of a network of safe, interconnected multi-use trails that link activity and resource areas, and connect with regional trail systems.
 - Policy PS 7.3 River Trails. Support opportunities to create multi-use trails along the Sacramento, Feather, and Bear Rivers, including enhancement of the Feather River Parkway, through collaboration with the cities of Yuba City and Live Oak.
 - o **Policy PS 7.4 Trail Opportunities.** Encourage the development of abandoned rights-of-way, levee tops, utility easements, and waterways for new multi-use trails.

Yuba-Sutter Bikeway Master Plan

The Yuba-Sutter Bikeway Master Plan, completed by the FRQAMD, provides comprehensive trail facility planning in Sutter County (Feather River Air Quality Management District 1995:i). The plan identifies the following goals, objectives, and policies for trails that apply to the Sutter Basin Project feasibility study area (Feather River Air Quality Management District 1995:6).

- **Goal 1.0:** Develop a comprehensive regional bikeway system as a viable alternative to the automobile for all trip purposes.
 - Objective: Improve on-street and off-street bicycling conditions through the construction and maintenance of bikeway facilities.
 - **Policy 1.2** Encourage the use of existing natural and manmade corridors such as creeks and railroad right of ways for future bike path alignments.
 - Policy 1.4 Develop a recreational bikeway system that uses lower volume streets, offstreet bike paths, and serves regional historic and natural destinations.

- **Policy 1.8** Develop a network of off-road mountain bicycling facilities that offer variety of experiences for the bicyclist while minimizing conflicts with hikers and equestrians, and environmental impacts.
- **Goal 2.0:** Maximize the amount of State and Federal funding for bikeway improvements that can be received by Yuba and Sutter Counties.
- **Goal 3.0:** Maximize Multi-Modal Connections to the Bikeway System.
- **Goal 4.0:** Improve bicycle safety conditions in Yuba and Sutter Counties.

City of Yuba City

Yuba City General Plan

Yuba City has a policy of achieving and maintaining a standard of 10 acres of park land per 1,000 population (City of Yuba City 2004:6-1). The City of Yuba City General Plan establishes several policies affecting recreation including bicycle and park facilities.

- Policy 5.4-I-1 Establish a network of on- and off-roadway bicycle routes and encourage their use for commute, recreational, and other trips. Design bike routes with the safety of cyclists as a priority.
- Policy 5.4-I-2 Develop bicycle routes that provide access to schools, parks, and the Feather River Parkway.
- Policy 6.1-I-1 Establish and maintain a standard of 10 acres of public parks per 1,000 residents. Specific standards are as follows: 1 acre of Neighborhood Parks, 1.5 acres of Community Parks, 1.5 acres of City Parks, and 6 acres of Specialized Recreation Area per 1,000 residents.
- O Policy 6.1-I-10 Implement the Feather River Parkway Strategic Plan in a manner consistent with the plans and programs put forth in that document and consistent with policies in the Open Space and Conservation Chapter (Chapter 8). Proposed actions include:
 - Improved pedestrian access to the riverfront;
 - Provide a mix of active- and non-active recreational and open space in those areas delineated in the Feather River Parkway Strategic Plan; and
 - Ensure that the open spaces proposed in the Feather River Parkway Strategic Plan be designed in a manner flexible enough to accommodate a variety of activities.

Feather River Parkway Strategic Plan

The Feather River Parkway Strategic Plan is master plan for the space between the western Feather River Levee and the Feather River within Yuba City. The plan calls for an extensive network of bicycle and pedestrian trails, wildlife habitat preserves, campgrounds, water focused recreation facilities, civic and urban plaza elements, beach recreation, and equestrian facilities. The plan divides the space into five distinct sub-areas each with a unique program and master plan (City of Yuba City 2002:III-9).

City of Live Oak

City of Live Oak 2030 General Plan

The City of Live Oak 2010 General Plan establishes a policy of achieving and maintaining a standard of 7 acres of park land per 1,000 population (City of Live Oak 2010). The City of Live Oak 2030 General Plan establishes several goals and policies affecting recreation including bicycle and park facilities (City of Live Oak 2010).

- **Goal CIRC-1:** Develop a highly connected circulation system.
- **Goal CIRC-2:** Improve the convenience and safety for multi-modal travel in existing development.
- **Goal CIRC-3:** Ensure safe and convenient daily travel for pedestrians, bicyclists, transit users, and drivers as Live Oak grows.
- **Goal PARKS-1:** Provide a variety of park land in the existing developed City to meet park standards.
- **Goal PARKS-2:** Ensure that accessible, high-quality park land is planned and developed as the City grows.
- **Goal PARKS-3:** Provide recreation facilities and programs to accommodate the needs of existing and future residents.
- **Goal PARKS-4:** Become a countywide or regional center for recreation.
 - Policy PARKS-4.1 The City will proactively coordinate with Sutter County and Yuba City to identify regional park and recreation needs, such as regional parks or trails, which could be planned, jointly funded, and developed in Live Oak.
 - Policy PARKS-4.2 The City will coordinate with the other cities and the county to plan for improvements at Live Oak Park and Recreation Area to support and complement future trails along the Feather River.
 - Policy PARKS-4.3 The City will coordinate with the California Department of Parks and Recreation on funding opportunities to support local recreational goals and plan for improvements in Live Oak that would complement any future nearby state parks and recreational lands.

A.3.12 Public Health and Environmental Hazards

A.3.12.1 Butte County

Butte County General Plan

The Health and Safety Element in the *Butte County General Plan* outlines goals, policies, and implementation policies that address natural to human-made hazards.

- **Goal HS-14:** Reduce risks from the harmful effects of hazardous materials.
 - **Policy HS-P14.1** The County supports the hazardous materials Emergency Response Plan (Area Plan).

- **Policy HS-P14.2** Hazardous materials carrier routes shall be designated to direct hazardous materials transport away from populated areas.
- O **Policy HS-P14.5** Environmental assessment and/or investigation shall be required prior to General Plan Amendment or Rezone approval that would allow uses with sensitive receptors, such as residential developments, schools, or care facilities, on sites previously used for commercial, industrial, agricultural or mining uses to determine whether soils, groundwater and existing structures are contaminated and require remediation. Policies and oversight authority shall follow Health and Safety Code Division 20, Chapters 6.5 and 6.8 when determining jurisdiction.
- **Goal HS-15:** Ensure that Butte County is prepared for emergency situations.
 - Policy HS-P15.1 The County shall conduct continuous advance planning to anticipate potential threats and improve emergency response effectiveness.
 - Policy HS-P15.2 Critical emergency response facilities such as fire, police, emergency service facilities and utilities shall be sited to minimize their exposure to flooding, seismic effects, fire, or explosion.
 - o **Policy HS-P15.3** Emergency access routes shall be kept free of traffic impediments.
 - o **Policy HS-P15.4** Streets and developed properties shall be clearly marked to enable easy identification.
 - Action HS-A15.1 Seek funding to develop community awareness and education
 programs for citizens that describe procedures and evacuation routes to be followed in
 the event of a disaster.

City of Biggs

City of Biggs General Plan

The Public Health and Safety Element of the City of Biggs General Plan establishes goals and policies that address public health and safety, and hazardous materials. These goals and policies address the city's approach to minimizing these hazards and maintaining a safe environment for residents.

- **Goal 6.1:** To ensure that the City and involved local agencies are able to effectively respond to emergency situations which may threaten the people or property of the Biggs community.
 - **Policy 6.1.A**: The City shall continue to participate in emergency preparedness planning with Butte County.
- **Goal 6.3:** Protect people and property within the City of Biggs against fire related loss and damage.
 - Policy 6.3.A: At a minimum, maintain current levels of service for fire protection by continuing to require development to provide and/or fund fire protection facilities, personnel, and operations and maintenance.
- Goal 6.6: Minimize the risk of personal injury, property damage, and environmental
 degradation resulting from the use, transport, disposal, and release/discharge of hazardous
 materials.

City of Gridley

City of Gridley General Plan

The Safety Element of the *City of Gridley General Plan* outlines key safety issues facing Gridley, public health and hazardous materials. Goals and policies in this element describe the city's approach to minimizing these hazards and maintaining a safe environment for residents.

- **Safety Goal 3:** To protect people and resources from hazards posed by hazardous materials, including their extraction, manufacture, storage, use, disposal, and transport.
 - Safety Policy 3.1: The City will require that hazardous materials are used, stored, transported, and disposed in a safe manner and in compliance with local, State, and federal safety standards.
 - Safety Policy 3.7: The City will review development requests and require that any airborne, waterborne, windborne, and other hazardous materials uses are fully disclosed, analyzed, and mitigated to ensure against any risk relative to any nearby planned or existing land uses and their users.
- **Safety Goal 4:** To reduce risks to people and structures from fires.
 - Safety Policy 4.1 The City will require setbacks, ignition resistant building materials, or other measures to reduce exposure to potential wildfires in areas designated for natural open space preservation, based on California Department of Forestry and Fire Protection recommendations and Maintenance of Defensible Space Measures, as appropriate.
- **Safety Goal 5:** To minimize the loss of life and damage to property from natural and human-caused hazards by ensuring adequate emergency routes and response.
 - Safety Policy 5.1 New developments and City investments shall be consistent with the information provided in the Butte County Multi-Jurisdictional All Hazard Pre-Disaster Mitigation Plan.
 - o **Safety Policy 5.2** The City will ensure the adequacy of disaster response and coordination with Butte County and the ability of individuals to survive disasters.
 - Safety Policy 5.4 The City will identify and maintain, in consultation with the Butte County
 Office of Emergency Services, evacuation routes and operational plans for relevant local
 hazards.
 - **Safety Policy 5.6** The City will require development and maintenance of a road system that provides adequate access for emergency equipment.

A.3.12.2 Sutter County

Sutter County General Plan

The Hazards and Hazardous Materials Element and Public Services Element of the *Sutter County General Plan* contains goals, policies, and actions aimed at reducing the risk associated with natural and human-made hazards within the county.

• **Goal PHS 3:** Protect health, safety, property, and the environment from the use, transport, disposal, and release/discharge of hazardous materials and waste.

- **Goal PHS 4:** Respond appropriately, effectively, and efficiently to natural and human-made emergencies and disasters.
 - Policy PHS 4.1 Emergency Operation Plans. Continue to implement and regularly update countywide emergency operation plans to reduce or eliminate long-term risk to life and property from natural or human-made emergencies and disasters.
 - o **Policy PHS 4.2 Evacuation Routes.** Regularly review established evacuation routes to ensure emergency access to and from all parts of the County.
 - o **Policy PHS 4.3 Post-Disaster Response.** Plan for the continued function of essential facilities following a major disaster to facilitate post-disaster response.
 - Policy PHS 4.4 Emergency Access. Require minimum road and driveway widths and clearances around structures consistent with established requirements in order to ensure emergency access.
 - Policy PHS 4.5 Emergency and Disaster Preparedness Training. Coordinate with local and regional agencies to regularly conduct emergency and disaster preparedness training to test operational and emergency plans.
 - Policy PHS 4.7 Coordination. Continue to be responsible for planning, preparedness, emergency response, and recovery activities associated with natural and human-made disasters. Provide communication and coordination between local and federal agencies, medical facilities, schools, local radio stations, and special needs service providers.
 - Policy PHS 4.8 Mutual Aid Agreements. Continue to participate in mutual aid agreements to ensure adequate resources, facilities, and other support services necessary for emergency response.

City of Yuba City

Yuba City General Plan

The Noise and Safety Element of the *Yuba City General Plan* provides information for the protection of the community from unreasonable risks associated with the effects of hazardous material accidents.

- Guiding Policy 9.4-G-2 Minimize the risk of personal injury, property damage, and environmental damage from fire, hazardous chemicals releases, natural and human made disasters.
- o **Implementing Policy 9.4-I-2** Prepare and disseminate information, including a page on the City's website, about emergency preparedness.
- o **Guiding Policy 9.5-G-1** Minimize the risk of property damage and personal injury resulting from the production, use, storage, disposal, or transportation of hazardous materials.
- Implementing Policy 9.5-I-1 Promote the reduction, recycling, and safe disposal of household hazardous wastes through public education and awareness. Expand collection programs in conjunction with new growth in the city.
- Implementing Policy 9.5-I-2 Continue to pursue funding to conduct pre-plan visits to hazardous materials sites within the city, as well as major roadway and rail corridors used for hazardous materials transport.

- **Implementing Policy 9.5-I-3** Require the clean-up of sites contaminated with hazardous substances.
- Implementing Policy 9.5-I-4 Implement policies contained in the Sutter County Hazardous
 Waste Management Plan that encourage and assist the reduction of hazardous waste from
 businesses and homes.
- Implementing Policy 9.5-I-6 Specify routes for transporting hazardous materials, taking into account areas of projected new growth.

City of Live Oak

City of Live Oak 2030 General Plan

The Public Safety Element of the *City of Live Oak 2030 General Plan* contains goals, policies, and implementation measures related to public safety in the city of Live Oak. This element directs the city to evaluate potential hazards, develop policies and procedures to avoid hazards, and create adequate emergency responses.

- **Goal PS-3.** Provide for adequate emergency response.
 - **Policy PS-3.1** The City shall maintain and update the City's emergency response plan, as needed, and ensure ongoing consistency with the General Plan.
 - o **Policy PS-3.2** The City will add a section to the emergency response plan on railroad safety to address potential releases related to accidents or spills of hazardous substances, such as gasoline, diesel, or transported hazardous materials/hazardous wastes.
 - Policy PS-3.3 The City will maintain mutual aid agreements with other agencies in Sutter County.
 - Safety Implementation Strategy 3.1: The City will maintain and update a list of hazardous sites, buildings, and uses in the Sphere of Influence or use databases that track the location of hazardous materials sites, buildings, and similar features. The City will use updated lists to evaluate and condition development, as necessary, to protect environmental and public health.
- Goal PS-4. Protect the community from the harmful effects of hazardous materials.
 - Policy PS-4.1: The City, through its discretionary review authority, will assess potential
 risks associated with hazardous materials used, stored, transported, and disposed, and
 ensure they are handled in a safe manner and in compliance with local, state, and federal
 safety standards.
 - o **Policy PS-4.2** The City will require that dumpsites for hazardous materials are cleaned in conformance with applicable federal and state laws before new uses are established.
 - Policy PS-4.3 The City will coordinate with appropriate federal, state, and regional agencies to address local sources of groundwater and soil contamination, including underground storage tanks, septic tanks, agriculture, and industrial uses.
 - Policy PS-4.4 New development adjacent to areas of ongoing agricultural development outside the City's Sphere of Influence shall provide agricultural buffers that are adequate to protect future residents from harmful effects of agricultural chemical use (see Conservation and Open Space Element).

 Policy PS-4.5 The City will support efforts to identify and remediate soils and groundwater contaminated with toxic materials, and to identify and eliminate sources contributing to such contamination.

A.3.13 Cultural Resources

A.3.13.1 Butte County

Butte County General Plan

The Butte County General Plan 2030 (Butte County 2010:253) contains a number of policies governing cultural resources. The following goals and policies of the Conservation and Open Space Element are relevant to review of the FRWLP.

- **Goal COS-14:** Preserve important cultural resources.
 - Policy COS-P14.2 As part of CEQA and NEPA projects, evaluations of surface and subsurface cultural resources in the county shall be conducted. Such evaluations should involve consultation with the Northeast Information Center.
- **Goal COS-15:** Ensure that new development does not adversely impact cultural resources.
 - Policy COS-P15.1 Areas found during construction to contain significant historic or prehistoric archaeological artifacts shall be examined by a qualified consulting archaeologist or historian for appropriate protection and preservation. Historic or prehistoric artifacts found during construction shall be examined by a qualified consulting archaeologist or historian to determine their significance and develop appropriate protection and preservation measures.
 - Policy COS-P15.2 Any archaeological or paleontological resources on a development project site shall be either preserved in their sites or adequately documented as a condition of removal. When a development project has sufficient flexibility, avoidance and preservation of the resource shall be the primary mitigation measure.
- **Goal COS-16** Respect Native American culture and planning concerns.
 - Policy COS-P16.2 Impacts to the traditional Native American landscape shall be considered during California Environmental Quality Act or National Environmental Protection Act review of development proposals.
 - Policy COS-P16.3 Human remains discovered during implementation of public and private development projects shall be treated with dignity and respect. Such treatment shall fully comply with the federal Native American Graves Protection and Repatriation Act and other appropriate laws.
 - Policy COS-P16.4 If human remains are located during any ground disturbing activity, work shall stop until the County Coroner has been contacted, and, if the human remains are determined to be of Native American origin, the NAHC and most likely descendant have been consulted.

A.3.13.2 Sutter County

Sutter County General Plan

The Sutter County General Plan (Sutter County 2011:9-16, 9-17) identifies the following policies.

- O Policy ER-8A: For projects subject to discretionary approval involving the demolition, relocation, or alteration of a building or structure over 45 years old or that would result in a change to the building or structure's immediate setting, the County shall require an assessment by a professional historic resource consultant to determine if the action would cause a substantial adverse change in the significance of an historical resource pursuant to CEQA Guidelines Section 15064.5.
- Policy ER-8b: If the historical resource assessment determines that the proposed action would cause a substantial adverse change in the significance of an historical resource, the County shall require as a condition of project approval the implementation of appropriate and feasible measures to reduce the potential impact, including the appropriate level of written and photographic documentation of significant historical resources that would be demolished.
- Policy ER 8-C: For projects subject to discretionary approval, which involve grading, excavation, or construction, require the applicant to hire a professional that meets the Secretary of Interior's professional qualifications standards for archaeology to conduct an archaeological resource investigation. As determined necessary by the archaeologist and the County, updated records search, pre-construction field surveys, research, and testing, and/or other methods that identify whether a substantial adverse impact on significant archaeological resource would occur. If cultural resources are discovered, the resource shall be examined by a qualified archaeologist to determine its significance and develop appropriate protection and preservation measures.
- o **Policy ER 8-D:** Require that when any subsurface cultural resources, paleontological resources, or human remains are encountered, all work within 100 feet of the discovery be stopped and the area protected from further disturbance until the discovery is evaluated. The appropriate County personnel shall be notified immediately. The resources shall be examined by qualified personnel to determine their significance and develop appropriate protection and preservation measures. If human remains are discovered, they shall be treated in compliance with applicable state and Federal laws, including notifying the County Coroner and consulting with the California Native American Heritage Commission, as appropriate.

City of Yuba City

Yuba City General Plan

Yuba City's adopted general plan (Yuba City 2004:8-8) provides the following guiding and implementing policies related to cultural resources.

- o **Guiding Policy: 8.3-G-1** Identify and preserve the archaeological, paleontological, and historic resources that are found within the Yuba City Planning Area.
- o **Implementing Policy 8.3-I-1** Encourage the preservation of historic sites, buildings, and structures.

- Implementing Policy 8.3-I-3 Promote the registration of historic sites, buildings, and structures in the National Register of Historic Places, and inclusion in the California Inventory of Historic Resources.
- o **Implementing Policy 8.3-I-4** Consult with the local Native American community in the cases where new development may result in disturbance to Native American sites.
- o **Implementing Policy 8.3-I-5** Require that new development analyze and avoid any potential impacts to archaeological, paleontological, and historic resources by:
 - Requiring a records review for development proposed in areas that are considered archaeologically sensitive;
 - Studying the potential effects of development and construction (as required by CEQA);
 - Requiring pre-construction surveys and monitoring during any ground disturbance for all development in areas of historical and archaeological sensitivity; and
 - Implementing appropriate measures to avoid the identified impacts.
- o **Implementing Policy 8.3-I-6** In accordance with CEQA and the State Public Resources Code, require the preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological resources are discovered.

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Appendix B Scoping Report

This appendix contains the scoping report that was prepared for and delivered to the U.S. Army Corps of Engineers and Sutter Butte Area Flood Control Agency on July 29, 2011, that documented the preparation and outcomes of the joint environmental scoping process for both the Sutter Basin Project and the Feather River West Levee Project held in June 2011.



Memorandum

Date:	July 29, 2011
То:	Matt Davis, U.S. Army Corps of Engineers
Cc:	Chris Elliott, ICF International, Jennifer Rogers, ICF International
From:	Ingrid Norgaard, ICF International
Subject:	Public Scoping Meeting Summary for the Sutter Basin Project and Feather River West Levee Project Environmental Scoping Meetings—June 27 and 28, 2011

Introduction

Two efforts are presently underway to study flood risk reduction improvements in Sutter and Butte Counties, one known as the Sutter Basin Feasibility Study, sponsored by the U.S. Army Corps of Engineers (USACE) to determine federal interest in flood risk reduction project(s), and one known as the Feather River West Levee Project (FRWLP), sponsored by the Sutter Butte Flood Control Agency (SBFCA) as a locally driven flood risk reduction project.

The two projects are being studied in close coordination because they at least partially overlap in their study areas, purpose, potential improvements, potential effects, and involved parties. Therefore, a joint scoping process is being conducted for the two projects to explain the relationship between the two efforts and obtain public input in a manner that is convenient, efficient, and integrated. It is anticipated that the two planning efforts will result in a separate Environmental Impact Study/Environmental Impact Report (EIS/EIR) for each project, in accordance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA).

Sutter Basin Feasibility Study

USACE initiated the Sutter Basin project in 2001 and is conducting a feasibility study to evaluate flood damage reduction, ecosystem restoration, and recreation opportunities within the study area. The Central Valley Flood Protection Board (CVFPB) and SBFCA, in their roles as non-federal local sponsors, are coordinating with USACE on the feasibility study. USACE, acting as the federal lead agency under NEPA, and SBFCA, acting as the state lead agency under CEQA, have determined that an EIS/EIR will be prepared to describe alternatives, potential environmental effects, and mitigation measures.

Public Scoping Meeting Summary—June 27 and 28, 2011 July 29, 2011 Page 2 of 8

FRWLP

SBFCA is planning the FRWLP to address levee deficiencies in the west levee of the Feather River from Thermalito Afterbay to the Sutter Bypass confluence to meet federal, state, and local flood protection criteria and goals. In 2010, an assessment district was enacted to provide local funding toward flood management improvements. These funds will be matched with those from the Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E) administered by the California Department of Water Resources (DWR). The purpose of the FRWLP would be to construct improvements as quickly as possible in advance of and compatible with the Sutter Basin Feasibility Study. USACE, acting as the federal lead agency under NEPA, and SBFCA, acting as the state lead agency under the CEQA, have determined that an EIS/EIR will be prepared to describe alternatives, potential environmental effects, and mitigation measures.

Development of the draft EIS/EIR to evaluate the FRWLP is underway and scheduled for public release in early 2012. A public release date for the Sutter Basin Project draft EIS/EIR has yet to be determined.

SBFCA and USACE have been carrying out scoping activities to assist them in determining the scope, and content of the environmental information for these two projects. SBFCA and USACE have had ongoing inter-agency consultation with responsible and interested agencies such as the Central Valley Flood Protection Board, Department of Fish and Game, Department of Water Resources (DWR), and California Regional Water Quality Control Board to name a few. In addition, SBFCA and USACE conducted a total of four public scoping meetings for the public and for federal and state agency staff on June 27th and June 28th, 2011. The following summarizes the outreach conducted to inform responsible and interested agencies and the public of the proposed projects, the scoping meetings, and the public comment received.

Noticing

Notice of Intent/Preparation

In compliance with the requirements set forth in CEQA, SBFCA and USACE prepared a Notice of Preparation (NOP). The NOP contained a brief description of the proposed project, project date, probable environmental effects, the date, time and place of the public scoping meetings, and contact information. The NOP solicited participation in determining the scopes and content of the environmental information of the EIS/EIRs. On May 20, 2011 the NOP was sent to Responsible and Trustee Agencies and involved federal agencies, to the State Clearinghouse, and parties previously requesting notice in writing. The comment period on the NOP was May 20, 2011 to July 08, 2011.

In compliance with the requirements set forth in NEPA, USACE prepared a Notice of Intent (NOI) describing its intent to prepare an EIS/EIR, the proposed action, the possible alternatives, and relevant scoping meeting and contact information. The NOI was posted in the Federal Register, the United States Government's official noticing and reporting publication, on May 20, 2011. The official comment period for the NOI was May 20, 2011 to July 08, 2011.

Public Scoping Meeting Summary—June 27 and 28, 2011 July 29, 2011 Page 3 of 8

Mailings

SBFCA utilized a previously developed mailing list of interested stakeholders to send an email notification encouraging attendance at the scoping meetings.

Notifications

Advertisements briefly introducing the lead agencies, the proposed projects and associated environmental review processes, and publicizing the scoping meetings were placed in the Appeal Democrat and the Gridley Herald newspapers. Both newspapers are intended to reach a local and regional public audience that residents routinely rely upon to keep them abreast of Sutter and Butte county issues. The advertisements were published in the Appeal Democrat on June 20 and June 27, 2011. The advertisements were published in the Gridley Herald on June 22 and June 24, 2011. A media release was also emailed out to a number media contacts within the region on June 22, 2011.

Attachment A contains copies of the following:

- Notice of Preparation
- Notice of Intent
- Email Notification
- Appeal Democrat and Gridley Herald Ledger Advertisements
- Media Release

Public Meetings

Four public scoping meetings were held to inform the public of the proposed projects and seek feedback on the range of alternatives, environmental effects, and issues of concern related to the Sutter Basin Project and the FRWLP. The four meetings were held at two different times for two days. On June 27, 2011 the meeting times were from 3:30 to 5:30 p.m. and 6:30 to 8:30 p.m., at the Yuba City Veterans Memorial Community Center. On June 28, 2011 the meeting times were from 3:30 to 5:30 p.m. and 6:30 to 8:30 p.m., at the Gridley Veterans Memorial Hall. The meeting locations were chosen as they are central to the region. The meeting times were chosen to accommodate both the work day schedules of public agency representatives and the general public, including residents and business owners.

The meetings were open-house style workshops in which attendees could read and view the information about the two projects and interact with project staff including SBFCA, USACE, DWR, HDR Engineering consultant staff, and ICF International (ICF) environmental consulting staff.

Twenty-six graphic display boards were on display for attendees to review. The boards described and illustrated the Sutter Basin Project and FRWLP history, purpose, need and objectives, study area, levee deficiencies and potential improvements, environmental considerations, the CEQA/NEPA process and project timeline and were on display for attendees to review. SBFCA, USACE, HDR and

Public Scoping Meeting Summary—June 27 and 28, 2011 July 29, 2011 Page 4 of 8

ICF staff were stationed at display boards to interact with public attendees and provide additional detail or answer any questions.

A Power Point presentation was given to provide a brief introduction to the Sutter Basin Project and the FRWLP including objectives, schedule, environmental compliance, and related flood control work in the region.

A fact sheet, providing an overview of the Sutter Basin Project and the FRWLP including purpose and goals, maps of the corresponding study areas, an overview of the environmental compliance process and timeline, was also made available.

Comment cards were prepared so that meeting attendees could provide feedback on the projects. These cards could be filled out during the meeting and given to a project team member.

Attachment B contains copies of the following:

- Display boards
- Power Point presentation
- Fact sheet
- Comment card templates

Public Feedback

There were 36 people in total who attended the two meetings. Twelve people attended the meeting from 3:30 to 5:00 p.m. and four people attended the meeting from 6:30 to 8:00 p.m. on June 27, 2011. Fifteen people attended the meeting from 3:30 to 5:00 p.m. and five people attended the meeting from 6:30 to 8:00 p.m. on June 28, 2011.

Five comments were received from the public regarding the EIS/EIRs during the scoping period. Below is a list summarizing the comments received.

- A request was made to keep the process for the Sutter Basin Feasibility Study on schedule so the state will be able to release EIP funding for the FRWLP.
- A comment was received regarding the importance of coordinating with the Lower Feather River Corridor Management Project so not to have to duplicate efforts on environmental studies.
- A comment was received in favor of the option of putting in a levee setback in the Nelson Slough area.
- A comment was received in opposition of the project.
- A comment addressed two issues. The first comment pertains to the lack of attention to the east levee of the Sutter Bypass. The second comment suggested using a perimeter levee around Yuba City, or a J levee on the south and west side.

Public Scoping Meeting Summary—June 27 and 28, 2011 July 29, 2011 Page 5 of 8

Attachment C contains copies of the following:

- Comments received from all interested parties (including those transcribed by court reporter)
- Attendee sign-in sheet templates

Next Steps

The comments received during the scoping period will assist in determining which issues are evaluated in detail in both the Sutter Basin Project and FRWLP EIS/EIRs. Once alternatives have been developed based on the scoping process and preexisting information, they will be analyzed, and draft EIS/EIRs will be developed. Upon the release of the draft EIR/EIS, the public will have 45 days to comment on the document. Additionally, at least one public hearing will be held so the public and agencies can learn more about both of the draft EIR/EISs, ask questions regarding the analysis, and provide comments. At these meetings, the alternatives will be presented and explained.

Development of the draft EIS/EIR to evaluate the FRWLP is underway and scheduled for public release in early 2012. A public release date for the Sutter Basin Project draft EIS/EIR has yet to be determined.

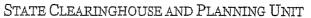
Attachment A

- Notice of Preparation
- Notice of Intent
- Email Notification
- Appeal Democrat and Gridley Herald Ledger Advertisements
- Media Release



STATE OF CALIFORNIA

GOVERNOR'S OFFICE of PLANNING AND RESEARCH





Notice of Preparation

May 20, 2011

To:

Reviewing Agencies

Re:

Sutter Basin Feasibility Study and Feather River West Levee Project

SCH# 2011052062

Attached for your review and comment is the Notice of Preparation (NOP) for the Sutter Basin Feasibility Study and Feather River West Levee Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely

Scott Morgan .

Director, State Clearinghouse

I Mugan

Attachments cc: Lead Agency

Document Details Report State Clearinghouse Data Base

SCH# 2011052062

Project Title Sutter Basin Feasibility Study and Feather River West Levee Project

Lead Agency Sutter Butte Flood Control Agency

Type NOP Notice of Preparation

Description Two efforts are presently underway to study flood risk reduction improvements in Sutter and Butte

Counties, one known as the Sutter Basin Feasibility Study, sponsored by the U.S. Army Corps of Engineers (USACE) to determine federal interest in flood risk reduction project(s), and one known as the Feather River West Levee Project (FRWLP), sponsored by the Sutter Butte Flood Control Agency

Fax

(SBFCA) as a locally driven flood risk reduction project.

Lead Agency Contact

Name Ingrid Norgaard

Agency Sutter Butte Flood Control Agency

Phone 916 737-3000 email inorgaard@icfi.com

Address c/o ICF International

630 K Street, Suite 400

City Sacramento State CA Zip 95814

Project Location

County Sutter, Butte

City

Region

Cross Streets Lat / Long

Parcel No.

Township Range Section Base

Proximity to:

Highways

Airports

. Railways

Waterways

Schools

Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Biological Resources; Archaeologic-Historic;

Geologic/Seismic; Toxic/Hazardous; Water Quality; Landuse; Other Issues; Minerals; Noise;

Population/Housing Balance; Public Services; Recreation/Parks; Economics/Jobs; Traffic/Circulation

Reviewing Agencies

Date Received 05/20/2011

Resources Agency; Department of Conservation; Central Valley Flood Protection Board; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources;

Department of Fish and Game, Region 2; Office of Emergency Management Agency, California; Native American Heritage Commission; State Lands Commission; Caltrans, District 3; State Water Resources Control Board, Division of Water Quality; Regional Water Quality Control Bd., Region 5 (Sacramento);

Regional Water Quality Control Bd., Region 5 (Redding)

Start of Review 05/20/2011

End of Review 06/20/2011

	1														
	Quality Cor	Evalu (KWQCB) RWQCB 1 Cathleen Hudson	North Coast Region (1) RWQCB 2 Environmental Document	San Francisco Bay Region (2) RWQCB 3 Central Coast Region (3)	RWQCB 4 Teresa Rodgers Los Angeles Region (4)	Central Valley Region (5) RWQCB 5F Central Valley Recion (5)	Fresno Branch Office RWQCB 5R Central Valley Region (5)	Redding Branch Office RWQCB 6 Lahontan Region (6)	RWQCB 6V Lahontan Region (6) — Victorville Branch Office	RWQCB 7 Colorado River Basin Region (7)	RWQCB 8 Santa Ana Region (8) RWQCB 9	San Diego Region (9)	Other	Last Updated on 01/10/11	
当うう シェート	Caltrans, District 8 Dan Kopulsky	Galtrans, District 9 Gayle Rosander Caltrans, District 10	Tom Dumas Caltrans, District 11 Jacob Amstrong	Call EPA	Air Resources Board Airport Projects Jim I emer	Transportation Projects Douglas Ito	Mike Tollstrup State Water Decourage Control	Board Regional Programs Unit Division of Financial Assistance	State Water Resources Control Board	Student Intern, 401 Water Quality Certification Unit Division of Water Quality	State Water Resouces Control Board Steven Herrera Division of Water Rights	Lept. or loxic substances Control CEQA Tracking Center Department of Pesticide Regulation CEQA Coordinator			
County: JULIA	Heritage	Debble Treadway Public Utilities Commission Leo Wong	Santa Monica Bay Restoration Guangyu Wang State Lands Commission Marina Brand	Tahoe Regional Planning Agency (TRPA) Cherry Jacques	Business, Trans & Housing Caltrans - Division of		California Highway Patrol Scott Loetscher Office of Special Projects	Housing & Community Development CEQA Coordinator	Tousing rolley bivision	Call		Caltrans, District 3 Bruce de Terra Caltrans, District 4 Lisa Carboni	Caltrans, District 5 David Murray	Michael Navarro Caltrans, District 7 Elmer Alvarez	
	Fish & Game Region 1E Laurie Hamsberger			Fish & Game Region 5 Don Chadwick Habitat Conservation Program	Gabrina Gatchel Habitat Conservation Program Fish & Game Region 6 I/M	brad henderson Inyo/Mono, Habitat Conservation Program Dept. of Fish & Game M	George Isaac Marine Region	Uther Departments Food & Agriculture Steve Shaffer	Depart, of General Services Public School Construction	Dept. of General Services Anna Garbeff Environmental Services Section	Dept. of Public Health Bridgette Binning Dept. of Health/Drinking Water	Independent Commissions,Boards Delta Protection Commission	Linda Flack Cal EMA (Emergency Management Agency)	Dennis Castrillo Governor's Office of Planning & Research State Clearinghouse	. · ·
The second of th	ources Agency	Resources Agency Nadell Gayou Deot. of Boating & Waterways	Mike Sotelo California Coastal Commission	Elizabeth A. Fuchs Colorado River Board Gerald R. Zimmerman	Dept. of Conservation Rebecca Salazar California Energy Commission	Eric Knight Cal Fire Allen Robertson	Central Valley Flood Protection Board James Herota	Office of Historic Preservation Ron Parsons	Dept of Parks & Recreation Environmental Stewardship Section	California Department of Resources, Recycling & Recovery	Sue O'Leary S.F. Bay Conservation & Dev't. Comm.	Steve McAdam Dept. of Water Resources Resources Agency Nadell Gayou	Conservancy	Land Game Depart. of Fish & Game Scott Flint	Environmental Services Division Fish & Game Region 1

Fish & Game Region 1 Donald Koch

POLICY JUSTIFICATION

Kingdom of Saudi Arabia - Night Vision Equipment

The Government of the Kingdom of Saudi Arabia has requested a possible sale of 200 High-performance In-Line Sniper Sight (HISS) Thermal Weapon Sights - 1500 meter, 200 MilCAM Recon III LocatIR Long Range, Light Weight Thermal Binoculars with Geo Location, 7,000 Dual Beam Aiming Lasers (DBAL A2), 6000 AN/PVS-21 Low Profile Night Vision Goggles (LPNVG), spare and repair parts, support equipment, technical documentation and publications, translation services, training, U. S. government and contractor technical and logistics support services, and other related elements of logistical and program support. The estimated cost is \$330 million.

This proposed sale will contribute to the foreign policy and national security of the United States by helping to improve the security of a friendly country which has been, and continues to be, an important force for political stability and economic progress in the Middle East.

The proposed sale will augment Saudi Arabia's capability to meet current and future threats from potential adversaries during operations conducted at night and during low visibility conditions. The Royal Saudi Land Forces (RSLF) are responsible for regional, perimeter, and border security operations. This proposed sale meets their defense and counter-terrorism requirements to deter current insurgent activity along their southern border and contributes to their overall military posture. The RSLF already has night vision devices in its inventory and will have no difficulty absorbing this night vision equipment into its inventory.

The proposed sale of this equipment will not alter the basic military balance in the region.

The prime contractors will be FLIR Inc. in Boston, Massachusetts and Laser Devices, Inc. in Monterey, California. There are no known offset agreements proposed in connection with this potential sale.

Implementation of this sale will not require the assignment of any U.S. Government or contractor representatives to recipient.

There will be no adverse impact on U.S. defense readiness as a result of this proposed sale.

[FR Doc. 2011–12405 Filed 5–19–11; 8:45 am]

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Notice of Intent To Prepare Draft Environmental Impact Statements/ Environmental Impact Reports for the Sutter Basin Feasibility Study and the Section 408 Permission for the Feather River West Levee Project, Sutter and Butte Counties, CA

AGENCY: Department of the Army, U.S. Army Corps of Engineers; DoD.

ACTION: Notice of intent.

SUMMARY: Pursuant to the National Environmental Policy Act of 1969, as amended, and the California Environmental Quality Act (CEQA), the U.S. Army Corps of Engineers (USACE) intends to prepare a separate Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for each of the following related flood risk management study efforts in northcentral California: a Feasibility Study of flood risk management and related water resources problems in the Sutter Basin conducted by USACE under the authority of the Flood Control Act of 1962 (Pub. L. 87-874); and under Section 14 of the Rivers and Harbors Act of 1899 (as amended) (33 U.S.C. 408), and Section 404 of the Clean Water Act (33 U.S.C. 1344), the proposed Feather River West Levee Project (FRWLP), sponsored by the Sutter Butte Flood Control Agency (SBFCA) as a locally driven flood management improvement project. The two projects are being studied in close coordination because they partially overlap in their study areas, purpose, potential improvements, potential effects, and involved parties. Therefore, a joint scoping process is being conducted for the two projects to explain the relationship between the two efforts and obtain public input in a manner that is convenient, efficient, and integrated. Figures of the two project areas can be viewed at the SBFCA Web site at: http://www.sutterbutteflood.org/ index.php/notices documents.

Sutter Basin Feasibility Study. On March 20, 2000, the State of California entered into a feasibility cost-sharing agreement (FCSA) with USACE to initiate a feasibility study. An amendment to the FCSA was signed in 2010, which included SBFCA as a non-Federal sponsor. The purpose of the study is to address flood risk, ecosystem restoration and recreation-related issues in the study area. If a Federal interest is determined, the study would result in a decision document, a General Investigation Feasibility Study report and EIS/EIR, which would be the basis for a recommendation to Congress for authorization. The Central Valley Flood Protection Board (CVFPB) and SBFCA are coordinating with USACE on the feasibility study. USACE, as the Federal lead agency under NEPA, and SBFCA, as the state lead agency under CEQA in coordination with CVFPB, have determined that an EIS/EIR will be prepared to describe alternatives, potential environmental effects, and mitigation measures.

FRWLP. SBFCA is planning the FRWLP to construct improvements to the west levee of the Feather River from Thermalito Afterbay to the Sutter Bypass confluence to meet Federal, state, and local flood protection criteria and goals. In 2010, an assessment district was enacted to provide local funding toward flood management improvements. These funds may be matched with those from the Early Implementation Program (funded through previous state bonds) administered by the California Department of Water Resources (DWR). In order to implement the project, the sponsor must acquire permission from USACE to alter the Federal project under Section 14 of the Rivers and Harbors Act of 1899 (as amended) (33 U.S.C. 408 or, Section 408). USACE also

has authority under Section 404 of the Clean Water Act (33 U.S.C. 1344) over activities involving the discharge of dredged or fill material to waters of the United States, which are known to be in the project area. The purpose of the FRWLP would be to construct improvements as quickly as possible in advance of and compatible with the Sutter Basin Project. USACE, acting as the Federal lead agency under NEPA, and SBFCA, acting as the state lead agency under the CEQA in coordination with CVFPB, have determined that an EIS/EIR will be prepared to describe alternatives, potential environmental effects, and mitigation measures.

DATES: Public scoping meetings will be held on Monday, June 27 at 3:30 p.m. and 6:30 p.m. at the Veterans Memorial Community Building, 1425 Veterans Memorial Circle, Yuba City, CA and on Tuesday, June 28 at 3:30 p.m. and 6:30 p.m. at the Veterans Memorial Hall, 245 Sycamore Street, Gridley, CA. Send written comments by July 8, 2011 (see ADDRESSES).

ADDRESSES: Written comments and suggestions concerning the scope and content of the environmental information may be submitted to Mr. Matt Davis, U.S. Army Corps of Engineers, Sacramento District, Attn: Planning Division (CESPK–PD–R), 1325 J Street, Sacramento, CA 95814. Requests to be placed on the mailing list also should be sent to this address.

FOR FURTHER INFORMATION CONTACT:

Questions about the proposed actions and environmental review process should be addressed to Matt Davis at (916) 557–6708, e-mail:

Matthew.G.Davis@usace.army.mil (see ADDRESSES).

SUPPLEMENTARY INFORMATION:

1. Proposed Action. Sutter Basin Feasibility Study. USACE is conducting a feasibility study to evaluate structural and non-structural flood-riskmanagement measures, including reoperation of existing reservoirs; improvements to existing levees; construction of new levees; and other storage, conveyance, and non-structural options. The Sutter Basin study area covers approximately 285 square miles and is roughly bounded by the Feather River, Sutter Bypass, Wadsworth Canal, Sutter Buttes, and Cherokee Canal. Flood waters potentially threatening the study area originate from the Feather River watershed and/or the upper Sacramento River watershed, above Colusa Weir. The study area is essentially encircled by project levees and the high ground of Sutter Buttes. Geotechnical analysis and historical performance during past floods

indicates the project levees are at risk of failure due to underseepage. The risk of levee failure coupled with the consequence of deep flooding presents a threat to public safety and property. Considering the collective changes to riparian and aquatic ecosystems brought about by agriculture, urbanization, mining, and flood risk management and water supply infrastructure, and the national concern for environmental quality and protection, every opportunity to restore and protect natural resources should be taken whenever changes in the water management system are being contemplated. Ecosystem restoration measures likely would include restoration of floodplain function and habitat. Recreation measures include those outdoor recreation opportunities associated with sustainable water resource development. The feasibility phase of this project is cost-shared 50% Federal, 50% non-Federal with the project sponsors, the State of California CVFPB and the SBFCA. The study will focus on alternatives in the study area that comprise flood risk management, ecosystem restoration, and recreation management measures. As part of the study, an EIS/EIR will be prepared with USACE as the lead agency under NEPA and SBFCA in cooperation with CVFPB as the lead agency under CEQA.

FRWLP. SBFCA is proposing a levee improvement project along the Feather River west levee under the California DWR's Early Implementation Program to expeditiously complete flood-risk reduction measures in advance of the Sutter Basin Feasibility Study. Known as the FRWLP, the project proposes to construct levee improvements between the Thermalito Afterbay and the Feather River/Sutter Bypass confluence. Primary deficiencies of the levee include through-seepage, under-seepage, and embankment instability (e.g., overly steepened slopes). Alternatives considered may include measures such as slurry cutoff walls, seepage berms, stability berms, internal drains, relief wells, sheet-pile walls, slope flattening, and potential new levee alignments. As part of the project, an EIS/EIR is being prepared. USACE has authority under Section 14 of the Rivers and Harbors Act of 1899 (as amended) (33 U.S.C. 408), over alterations to Federal flood control project levees and any such alterations as proposed by SBFCA are subject to approval by USACE. USACE also has authority under Section 404 of the Clean Water Act (33 U.S.C. 1344) over activities involving the discharge of dredged or fill material to waters of the United States, which are known to be in

the project area. Due to these authorities, USACE is acting as the lead agency for the EIS pursuant to NEPA. SBFCA will be acting as the lead agency for the EIR according to CEQA as an agency of the State of California with delegated authority to approve the project.

- 2. Alternatives. The EIS/EIRs will consider several alternatives for reducing flood damage. Alternatives analyzed during the investigation will consist of a combination of one or more measures to reduce the risk of flooding. These measures include installing cutoff walls, and constructing seepage berms.
 - 3. Scoping Process.
- a. A series of public scoping meetings will be held on June 27 and 28, 2011, to present information to the public and to receive comments from the public on both the feasibility study and the FRWLP. These meetings are intended to initiate the process to involve concerned individuals, and local, state, and Federal agencies.
- b. Significant issues to be analyzed in depth in the environmental documents include effects on hydraulics, wetlands and other waters of the U.S., vegetation and wildlife resources, special-status species, aesthetics, cultural resources, recreation, land use, fisheries, water quality, air quality, transportation, and socioeconomics; and cumulative effects of related projects in the study area.
- c. USACE is consulting with the State Historic Preservation Officer to comply with the National Historic Preservation Act and with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to comply with the Endangered Species Act. USACE also is coordinating with the U.S. Fish and Wildlife Service to comply with the Fish and Wildlife Coordination Act.
- d. A 45-day public review period will be provided for individuals and agencies to review and comment on the draft environmental documents. All interested parties are encouraged to respond to this notice and provide a current address if they wish to be notified of the draft EIS/EIR circulation.
- 4. Availability. The draft EIS/EIR for the FRWLP is scheduled to be available for public review and comment in late 2011. The draft EIS/EIR for the Sutter Basin Feasibility Study is scheduled to be available for public review and comment in mid 2012.

Dated: May 12, 2011.

Andrew B. Kiger,

LTC, EN, Commanding.

[FR Doc. 2011-12510 Filed 5-19-11; 8:45 am]

BILLING CODE 3720-58-P

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Notice of Availability of the Final Programmatic Environmental Impact Statement for the Mechanical and Artificial Creation and Maintenance of Emergent Sandbar Habitat in the Riverine Segments of the Upper Missouri River, Missouri River Basin, United States

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD. **ACTION:** Notice of Availability.

SUMMARY: In accordance with the National Environmental Policy Act of 1969, as amended, the U.S. Army Corps of Engineers intends to file a Final Programmatic Environmental Impact Statement (FPEIS) for the Mechanical and Artificial Creation and Maintenance of Emergent Sandbar Habitat on the Riverine Segments of the Upper Missouri River with the U.S. Environmental Protection Agency. The FEIS is available for final public review. Details on the proposed action, location and areas of environmental concern addressed in the FPEIS are provided below under SUPPLEMENTARY INFORMATION.

DATES: The review period will be open 30 days from the date of this notice. The Record of Decision is anticipated to be issued in August, 2011.

ADDRESSES: Written comments should be sent to: Department of the Army; Corps of Engineers, Omaha District; CENWO-PM-AC; ATTN: Emergent Sandbar Habitat Programmatic EIS; 1616 Capitol Avenue; Omaha, NE 68102– 4901, or e-mailed to:

Cynthia.s.upah@usace.army.mil.
Comments must be postmarked,
e-mailed, or otherwise submitted no
later than June 13, 2011. Copies of the
FPEIS have been sent to all agencies and
individuals who participated in the
scoping process or public hearings and
to those requesting copies. The FEIS is
available online at: http://

www.moriverrecovery.org/mrrp/MRRP_ PUB_DEV.download_documentation_ peis. To obtain a copy, please contact Ms. Cynthia Upah.

FOR FURTHER INFORMATION CONTACT: Ms. Cynthia Upah, Project Manager, by telephone: (402) 995–2672, by mail: 1616 Capitol Avenue, Omaha, NE 68102–4901, or by e-mail: Cynthia.s.upah@usace.army.mil. For inquires from the media, please contact the USACE Omaha District Public Affairs Officer (PAO), Ms. Monique Farmer by telephone: (402) 995–2416,

by mail: 1616 Capitol Avenue, Omaha, NE 68102, or by e-mail: Monique.l.farmer@usace.army.mil.

SUPPLEMENTARY INFORMATION: 1.

Background. The Emergent Sandbar Habitat (ESH) program is being implemented by the U.S. Army Corps of Engineers (Corps) for the benefit of the interior population of the Interior least tern (least tern) and the northern Great Plains piping plover (piping plover). This implementation program resulted from a Biological Opinion (BiOp) issued by the U.S. Fish and Wildlife Service (USFWS) in which the Reasonable and Prudent Alternative (RPA) called for the Corps to provide sufficient ESH acreage in order to meet biological metrics (fledge ratios) to avoid jeopardizing continued existence of the species, as defined by the Endangered Species Act (ESA).

The FPEIS is needed to provide National Environmental Policy Act (NEPA) coverage for the mechanical and artificial construction of ESH in the riverine segments of the Upper Missouri River, pursuant to the 2003 BiOp Amendment RPA IV(b) 3, and to compare impacts among a range of alternatives. The goal is to inform the selection of a preferred alternative that allows for the creation and replacement of sufficient habitat to support tern and plover populations on the Missouri River in a safe, efficient and costeffective manner that minimizes negative environmental consequences.

Alternatives to the proposed project that are considered in the FPEIS include (1) no action, including existing program activities and no action; (2) and 6 action alternatives of various acreage creation. Environmental issues addressed in the FPEIS include hydrology, water quality, aggradation and degradation, biological resources, air quality, noise and recreation.

After detailed consideration of the environmental and social impacts, and cumulative effects, of the Alternatives, the Corps has identified an Adaptive **Management Implementation Process** (AMIP) as the preferred alternative, and not one of the specific acreage alternatives. The key aspect of the AMIP is that, rather than selecting a specific acreage alternative and pursuing such construction, actions would be progressively implemented with the focus on monitoring a combination of biological and physical metrics (measurements). Implementation of progressively larger acreage amounts of habitat would continue until the desired biological response is attained and sustained.

Join Us To Learn More About Local Flood Risk Reduction Efforts

Join the U.S. Army Corps of Engineers (USACE) and the Sutter Butte Flood Control Agency (SBFCA) for a public scoping meeting to learn about two proposed flood risk reduction efforts in Sutter and Butte counties. USACE's Sutter Basin Feasibility Study will look at potential improvements throughout the Sutter Basin, while SBFCA's Feather River West Levee Project is proposing to repair 44 miles of the river's west levee.

The public is encouraged to attend these meetings to comment on the scope of the proposed projects and the preparation of related environmental documents.

Meeting Dates & Times
June 27 at 3:30 p.m. and 6:30 p.m.
Veterans Memorial Community Building
1425 Veterans Memorial Circle, Yuba City

June 28 at 3:30 p.m. and 6:30 p.m. Gridley Veterans Memorial Hall 249 Sycamore Street, Gridley

A presentation will begin 30 minutes after the start of each meeting. The same information will be presented at each meeting.

If you have questions or need special assistance or accommodations at a meeting, call 916-231-9618 at least 72 hours in advance of the meeting you plan to attend.





Join Us To Learn More About Local Flood Risk Reduction Efforts

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www.sutterbutteflood.org • www.spk.usace.army.mil

FOR IMMEDIATE RELEASE CONTACT: INGRID NORGAARD

EMAIL: <u>inorgaard@icfi.com</u> PHONE: 916-737-3000

Agencies Hosting Public Meetings Related to Proposed Flood Improvements in Sutter and Butte Counties

The public is invited to attend to provide input on environmental process

Yuba City, June 22, 2011—The U.S. Army Corps of Engineers' (USACE) Sacramento District and the Sutter Butte Flood Control Agency (SBFCA) will hold four public scoping meetings on June 27 and 28 to provide the public an opportunity to comment on proposed regional flood risk management projects.

The purpose of the USACE's Sutter Basin Project is to address flood risk management, ecosystem restoration, and recreation issues in the Sutter Basin study area. The project is currently in the feasibility study phase. The study area covers approximately 285 square miles and is roughly bounded by the Feather River, Sutter Bypass, Wadsworth Canal, Sutter Buttes and Cherokee Canal.

SBFCA is planning the Feather River West Levee Project (FRWLP) to address levee deficiencies found along 44 miles of the west levee of the Feather River from the Thermalito Afterbay south to the Sutter Bypass. The west levee provides flood risk management benefits to the cities of Yuba City, Gridley, Live Oak, and Biggs and portions of unincorporated areas of Butte and Sutter counties. Measures are being evaluated to meet Federal, state, and local flood protection criteria and goals.

The Sutter Basin Project and FRWLP are being studied in close coordination because of related study areas, purpose, potential measures and potential effects. It is anticipated that two separate environmental impact statements/environmental impact reports (EIS/EIR) will be developed—one for the Sutter Basin Project and one for FRWLP. The public release of the draft EIS/EIR to evaluate FRWLP is scheduled for early 2012. The release of the Sutter Basin Project's draft EIS/EIR has yet to be determined. The California Department of Water Resources and Central Valley Flood Protection Board are also involved in these two efforts.

Combined and coordinated scoping for the two efforts is being conducted to ensure an efficient process for interested stakeholders. Public input will be solicited about the content of the environmental documents. Please join us at one of four scoping meetings to provide input.

City of Yuba City

June 27 at 3:30 p.m. *and* 6:30 p.m. Veteran's Memorial Community Bldg. 1425 Veterans Memorial Circle, Yuba City

City of Gridley

June 28 at 3:30 p.m. and 6:30 p.m. Gridley Veteran's Memorial Hall 249 Sycamore Street, Gridley A presentation will be given 30 minutes after each meeting begins. The content of all four meetings will be the same. For questions about the meetings or to make special accommodations for attendees, contact Ms. Norgaard at 916-737-3000 or via email at inorgaard@icfi.com.

Learn more about the Sutter Basin Project at www.spk.usace.army.mil and about the FRWLP at www.sutterbutteflood.org.

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Attachment B

- Display boards
- Power Point presentation
- Fact sheet
- Comment card templates

Station 2 - Overview, Purpose, and Objectives 110x13

2A
About the SBP
36x18

2D Inside Look at a Levee 30x24 2F
About the FRWLP
36x18

2B
SBP Study Area MAP
36x24

Typical Levee Deficiencies
30x24

FRWLP Study Area MAP 36x24

CDDT: 6 I: 6

FDWIDTime Cline O Funding

Station 3 - Potential Measures 110x13

3A	3B	3C	3D
Slurry Wall	Stability Berm	Seepage Berm	Relief Well
25x20	25x20	25x20	25x20
3E	3F	3G	3H
Sheet-Pile Wall	Slope Flattening	Internal Drain	New/Relocated Levee
25x20	25x20	25x20	25x20
31	3J	3K	3L

Non-Structural

Re-Operation

Ecosystem Restoration

Recreation

Station 4 - Environmental Process 110x13

4A
About NEPA/CEQA
24x32

4B
Scoping
24x32

4C Enviro Issues 24x32 4D
Regulatory Compliance
24x32

4E
SBP Photo
52x32

4F
FRWLP Photo
52x32

Welcome to the Sutter Basin Project & Feather River West Levee Project Environmental Scoping Meeting





Overview, Purpose, and Objectives

About the Sutter Basin Project

In 2000, the State of California and USACE entered into a cost-sharing agreement to initiate a feasibility study within the Sutter Basin. An amendment of the cost-sharing agreement was signed in July 2010 to include SBFCA as a non-Federal sponsor. The purpose of the feasibility study is to address flood risk management, ecosystem restoration, and recreation issues in the study area.

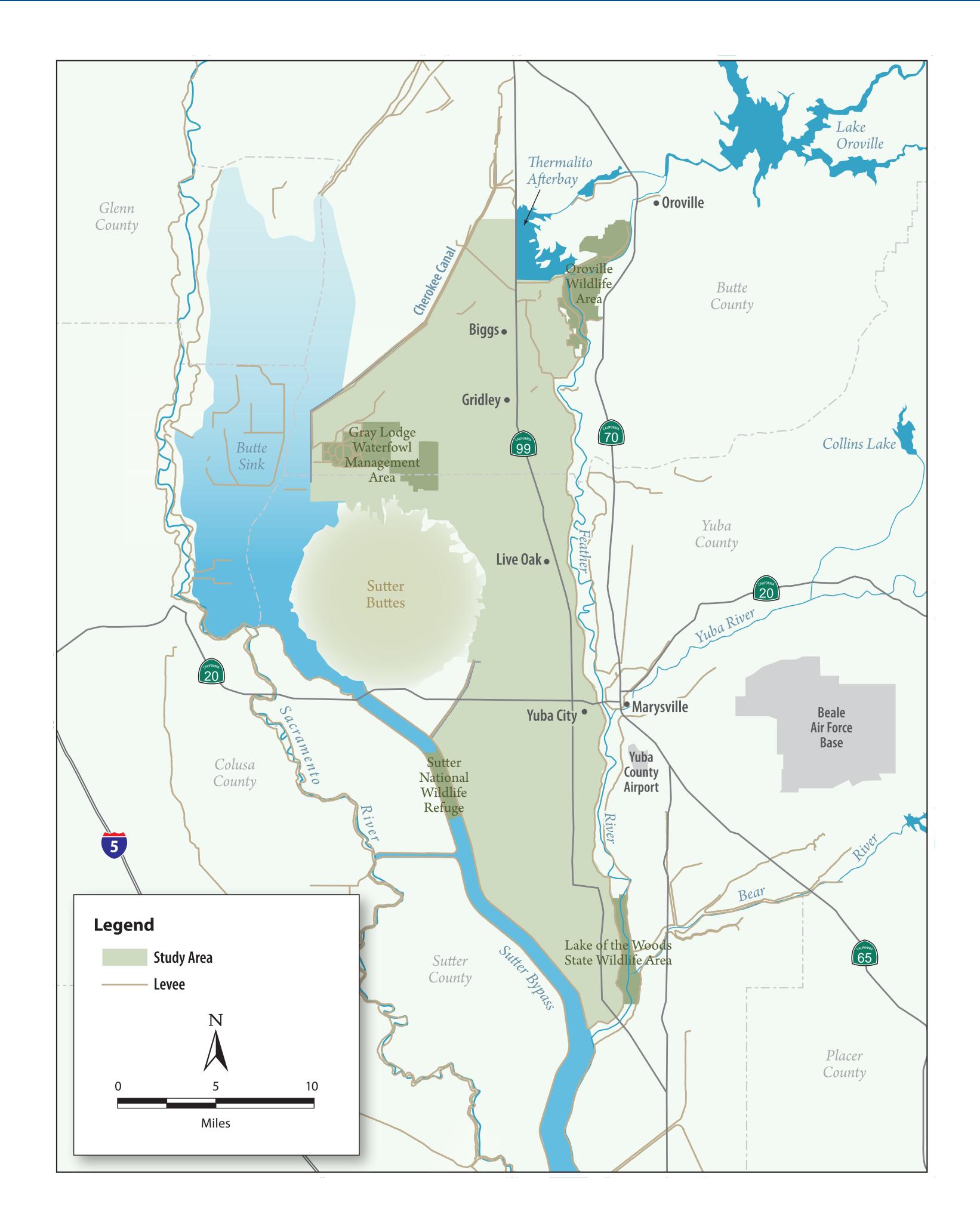
The Sutter Basin Project feasibility study evaluates approximately 285 square miles that are roughly bounded by the Feather River, Sutter Bypass, Wadsworth Canal, Sutter Buttes, and Cherokee Canal. The study area is essentially encircled by project levees and the high ground of the Sutter Buttes. Past flood events and geotechnical analysis show these levees have a higher probability of failure related to through-and under-seepage than levees designed to meet current standards. Additionally, the levees are at risk of overtopping from floods greater than they are designed to withstand.

As part of the Sutter Basin Project feasibility study, USACE is evaluating a variety of flood risk management measures that could include re-operation of reservoirs; improvements to existing levees; construction of new levees; other storage, conveyance, and non-structural options; and measures that could potentially restore the ecosystem within the study area and develop or expand recreation facilities.

This study will be the basis for a recommendation to Congress to address water resources and related issues within the study area.

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Sutter Basin Project Area



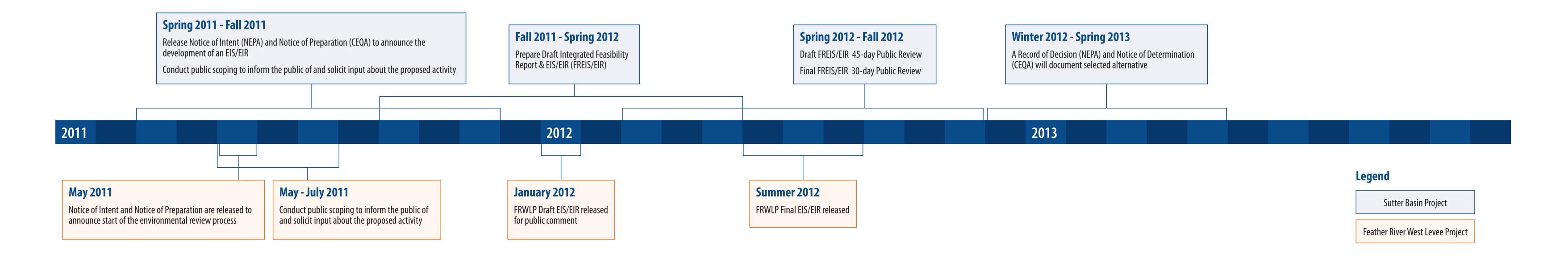
2B - SBP Study Area.indd 1

Sutter Basin Project Funding and Timeline

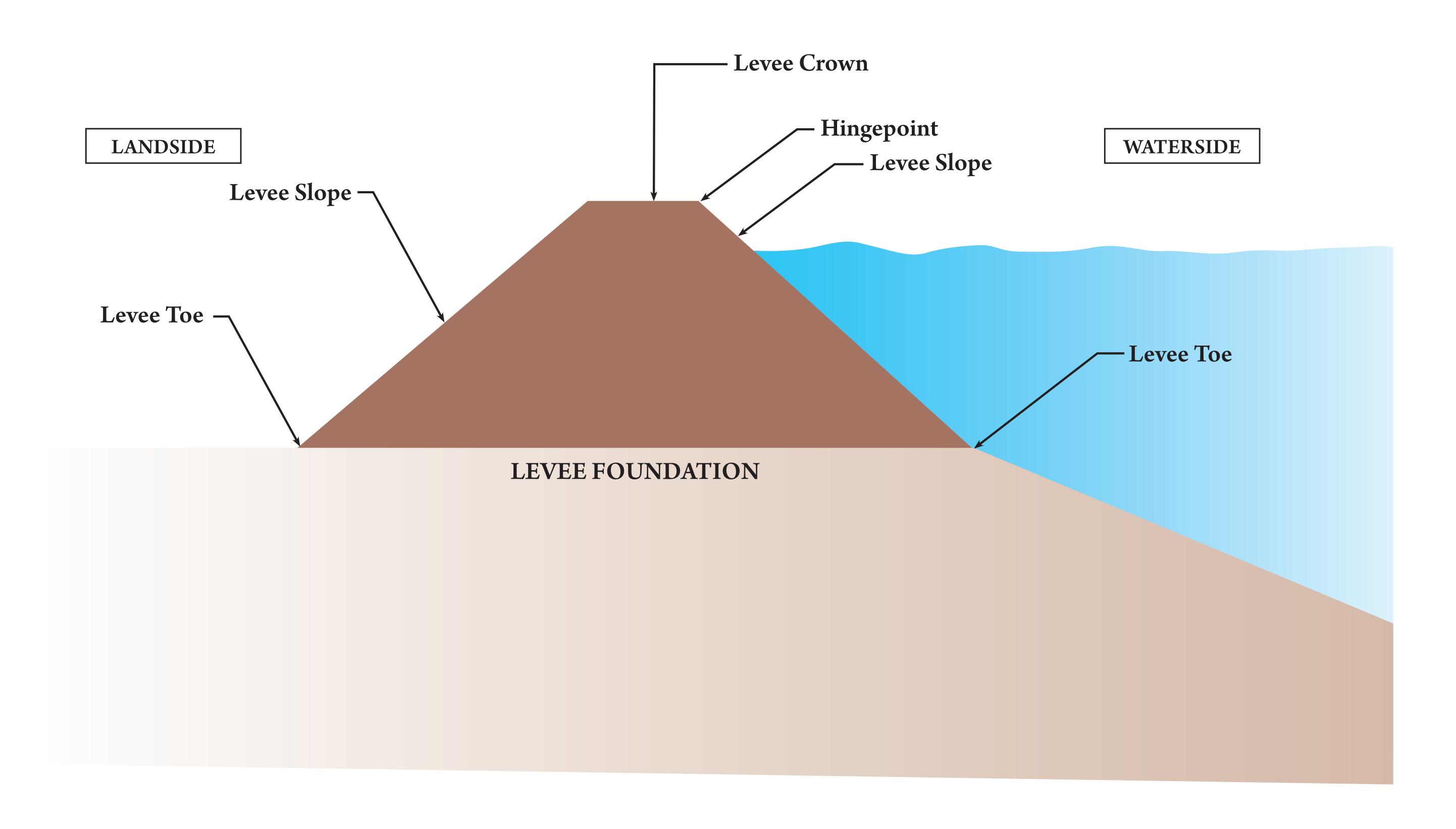
Funding

The feasibility study phase of this project is cost-shared; USACE will fund 50% and SBFCA and the State of California will fund the remaining 50% of the project.

Timeline

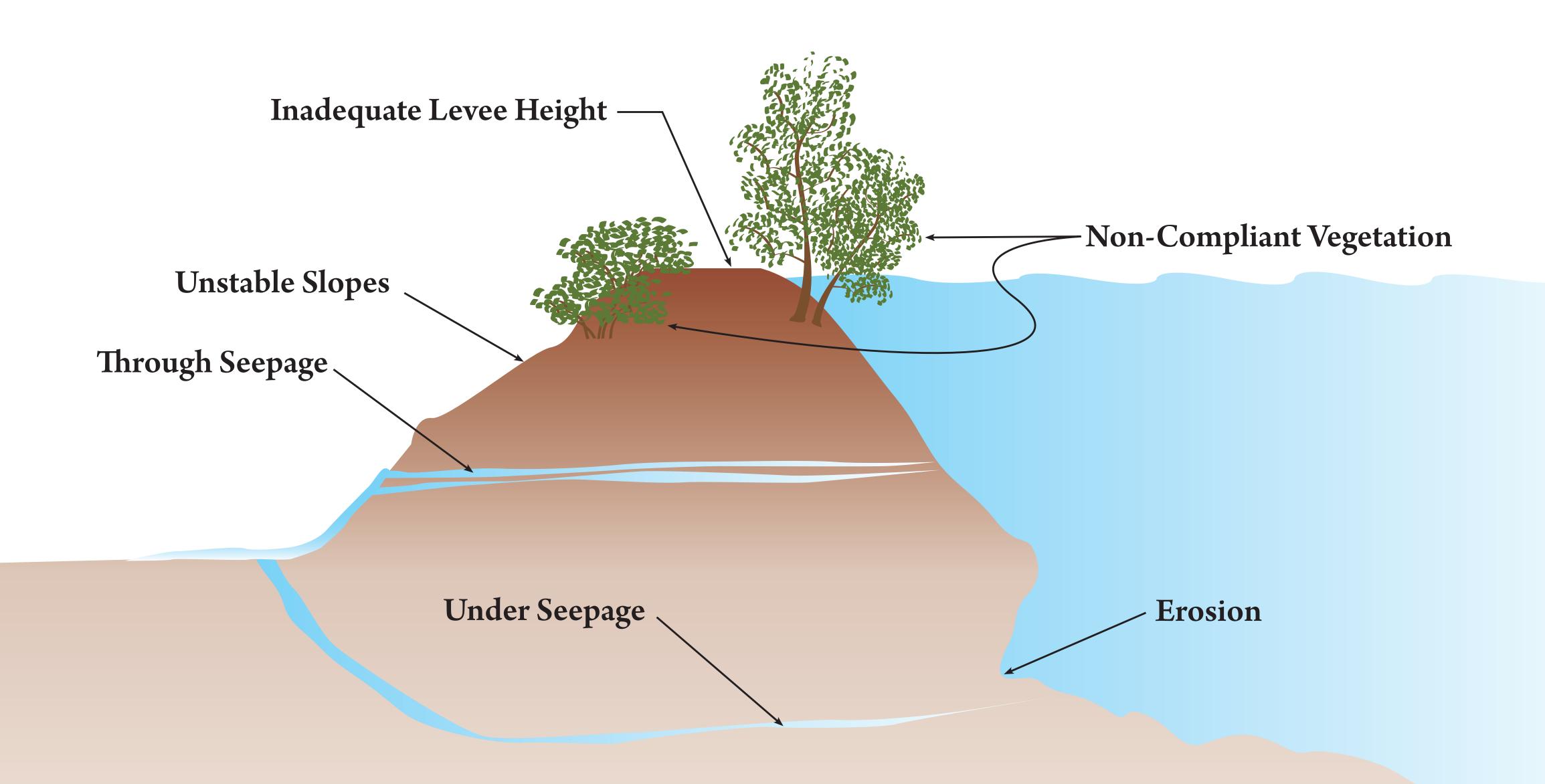


An "Inside" Look at a Levee



Look at Levee.indd 1

Typical Levee Deficiencies



- Unstable Slopes irregular or overly steep slopes compromise the levee structure
- Inadequate levee height levee height may be too low relative to predicted water levels
- Non-Compliant Vegetation can lead to levee instability and hinder levee monitoring and maintenance
- Erosion water flow, wakes and waves, remove soil material, damaging the levee
- Seepage

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About the Feather River West Levee Project

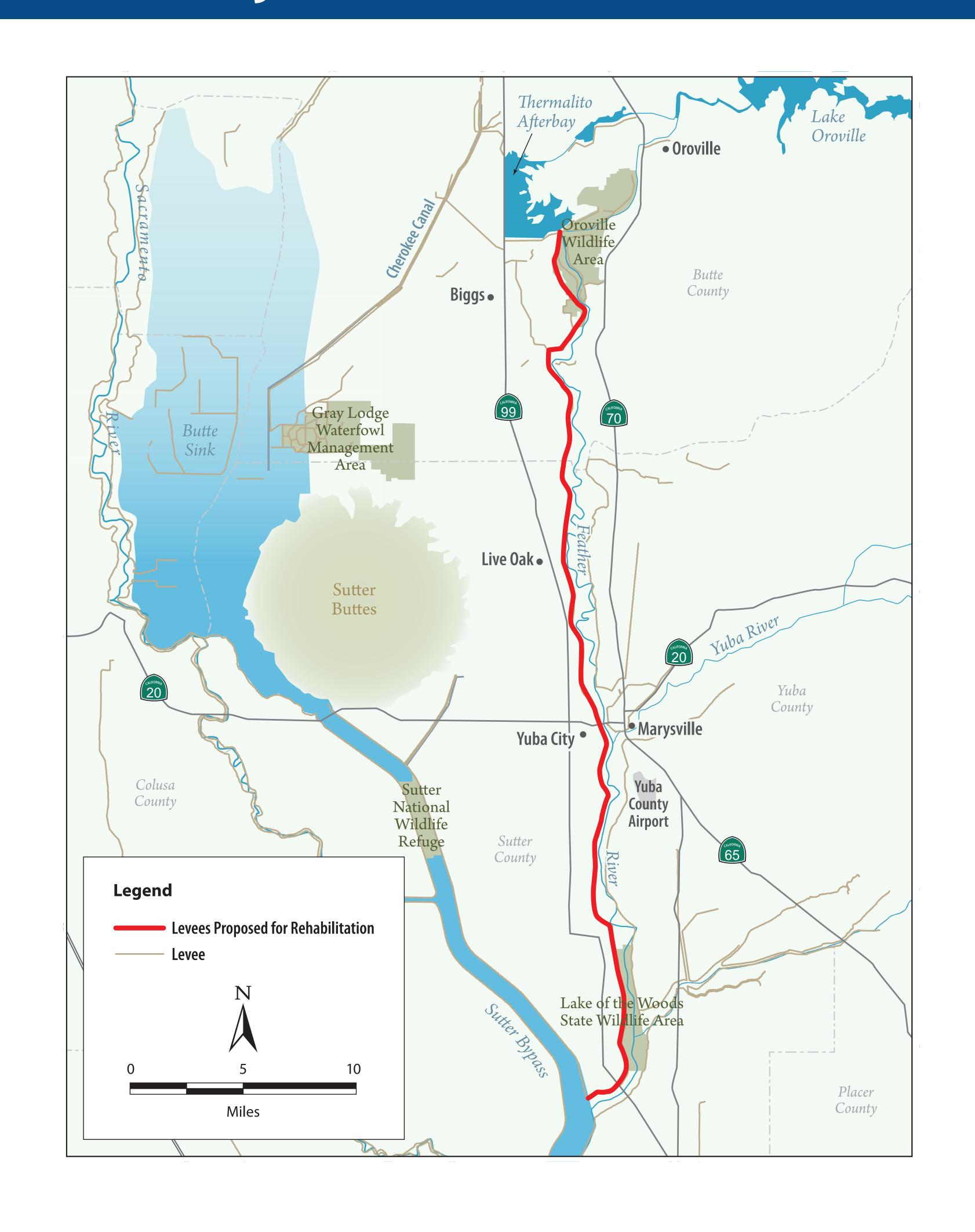
Communities in both Butte and Sutter Counties have an unfortunate historical knowledge of devastating flood events within the region. Sutter Butte Flood Control Agency (SBFCA) is planning the Feather River West Levee Project (FRWLP) to address levee deficiencies found along 44 miles of the west levee of the Feather River from the Thermalito Afterbay south to the Sutter Bypass. Measures are being evaluated to meet Federal, state, and local flood protection criteria and goals. The FRWLP is expected to:

- Increase public safety by providing 200-year flood protection from Yuba City north to the Thermalito Afterbay, and the appropriate level of flood protection south of Yuba City (in conjunction with repairs to the Sutter Bypass, which are the responsibility of the state).
- Save property owners millions of dollars annually in flood insurance costs by delaying, preventing, or cutting short FEMA floodplain mapping.
- Allow cities and counties to implement general plans, which will soon be restricted for any urban or urbanizing community without 200-year flood protection. This would not apply to areas with fewer than 10,000 residents.
- Sustain and grow the local economy by creating construction jobs, protecting property values, and allowing for responsible development.

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Feather River West Levee Project Area

2G - FRWLP Study Area.indd 1



Feather River West Levee Project Funding and Timeline

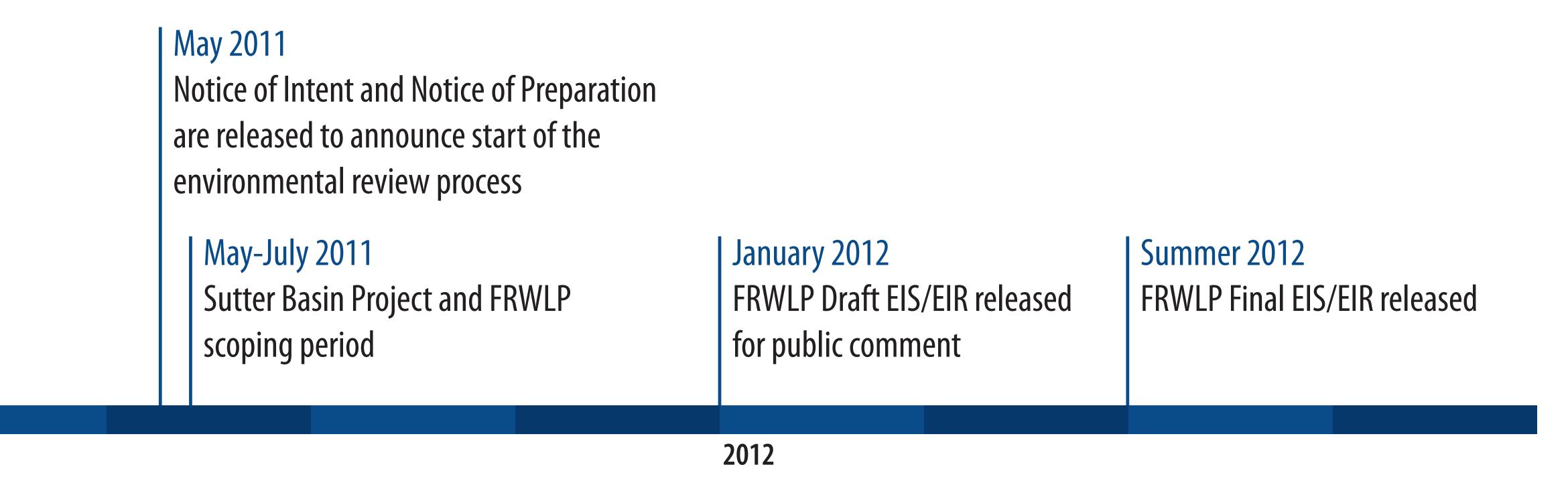
Funding

The FRWLP is estimated at \$250 million for construction. A local assessment district enacted in 2010 will pay 29% of the project cost and the State of California is expected to pay the remaining share.

Timeline

2011

Environmental specialists are currently analyzing the effects the FRWLP could have if implemented, to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This analysis will help engineers finalize the project design, and request Federal and state permits. The goal is to construct the FRWLP as quickly as possible in advance of and compatible with the Sutter Basin Project, potentially beginning construction in 2013.



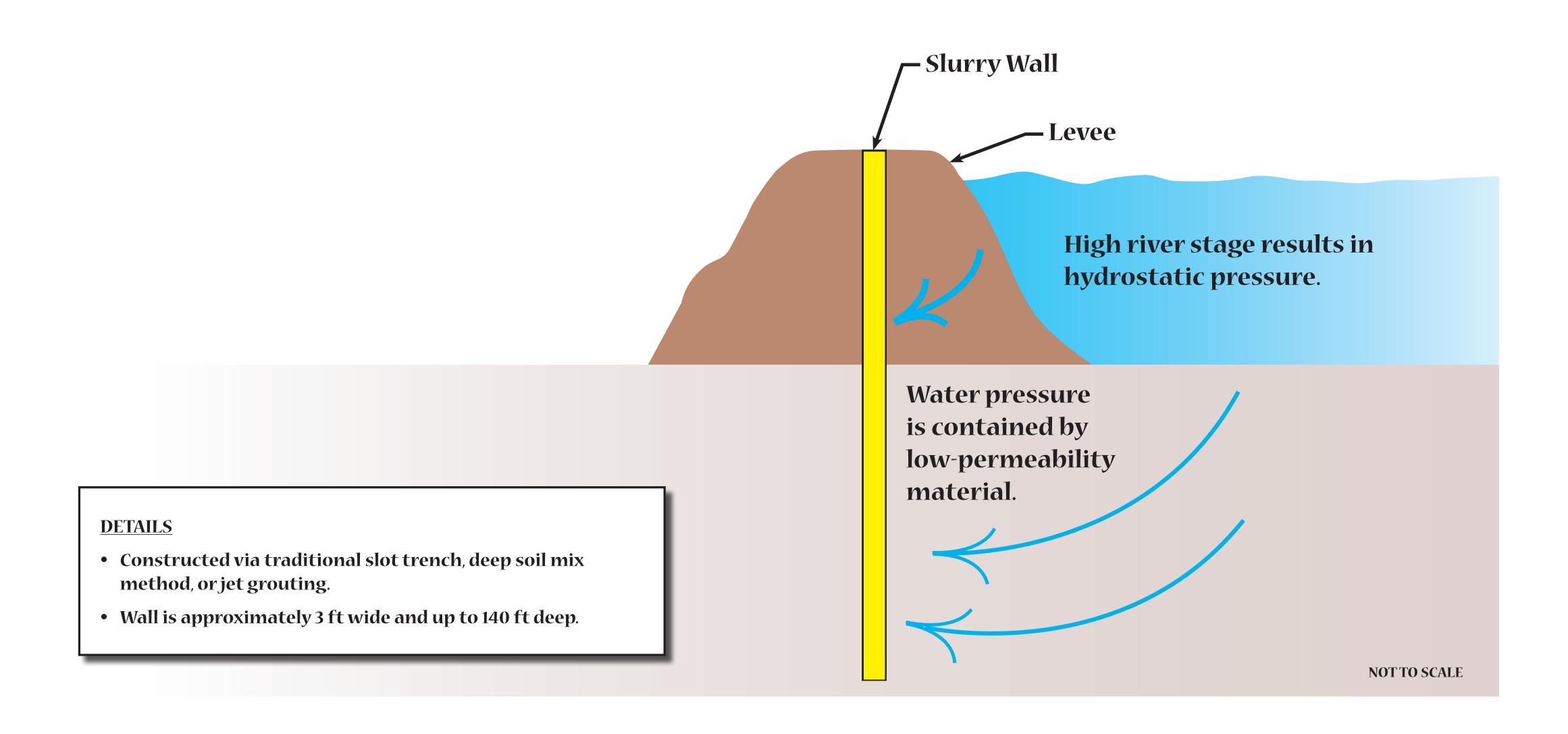
2H - Funding and Timeline.indd 1

Potential Measures

Slurry Cut-off Wall

Concept:

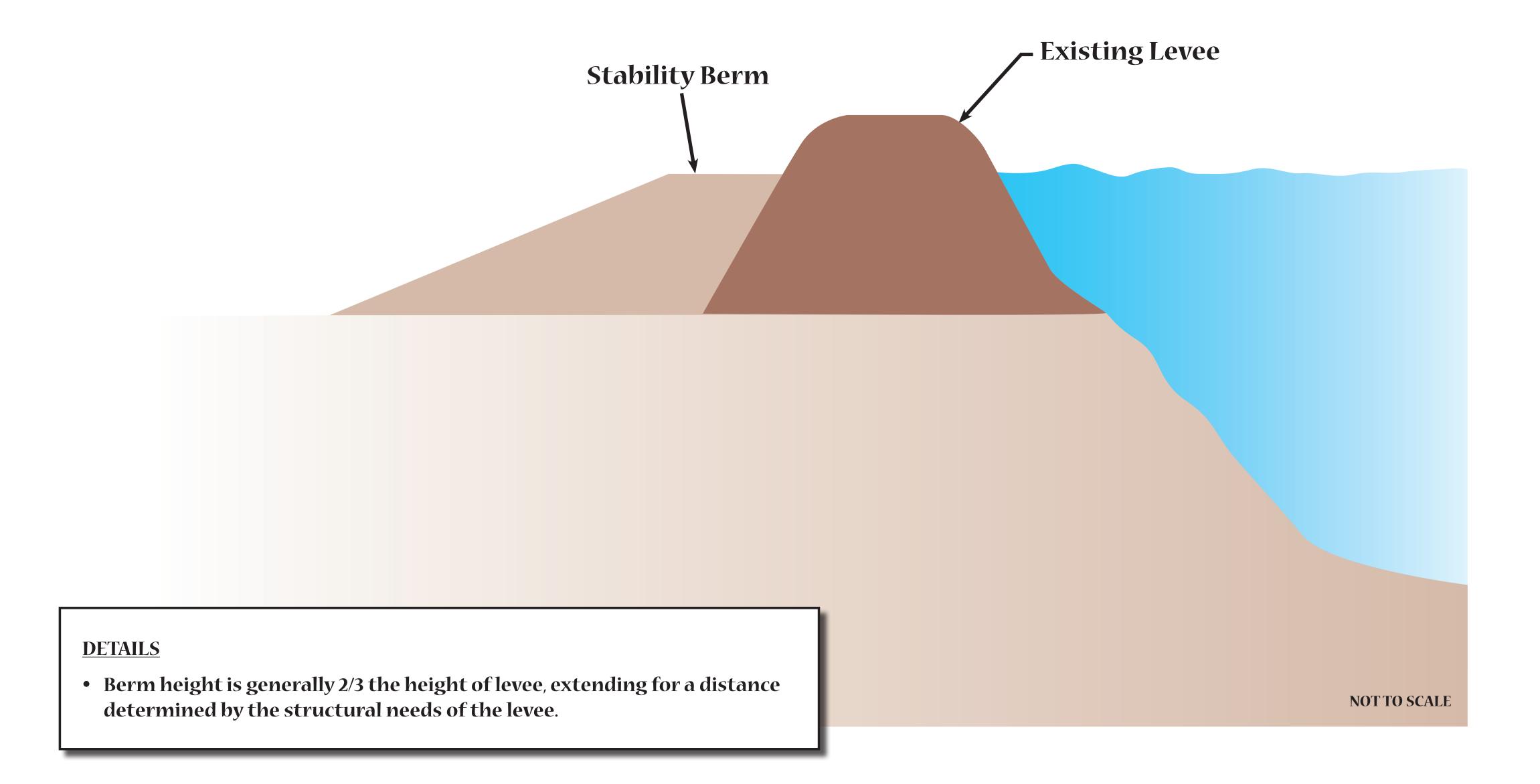
Water-seepage and through-seepage are controlled by a low-permeability wall constructed within the levee cross section.



Stability Berm

Concept:

Provides additional support to levee to increase strength.

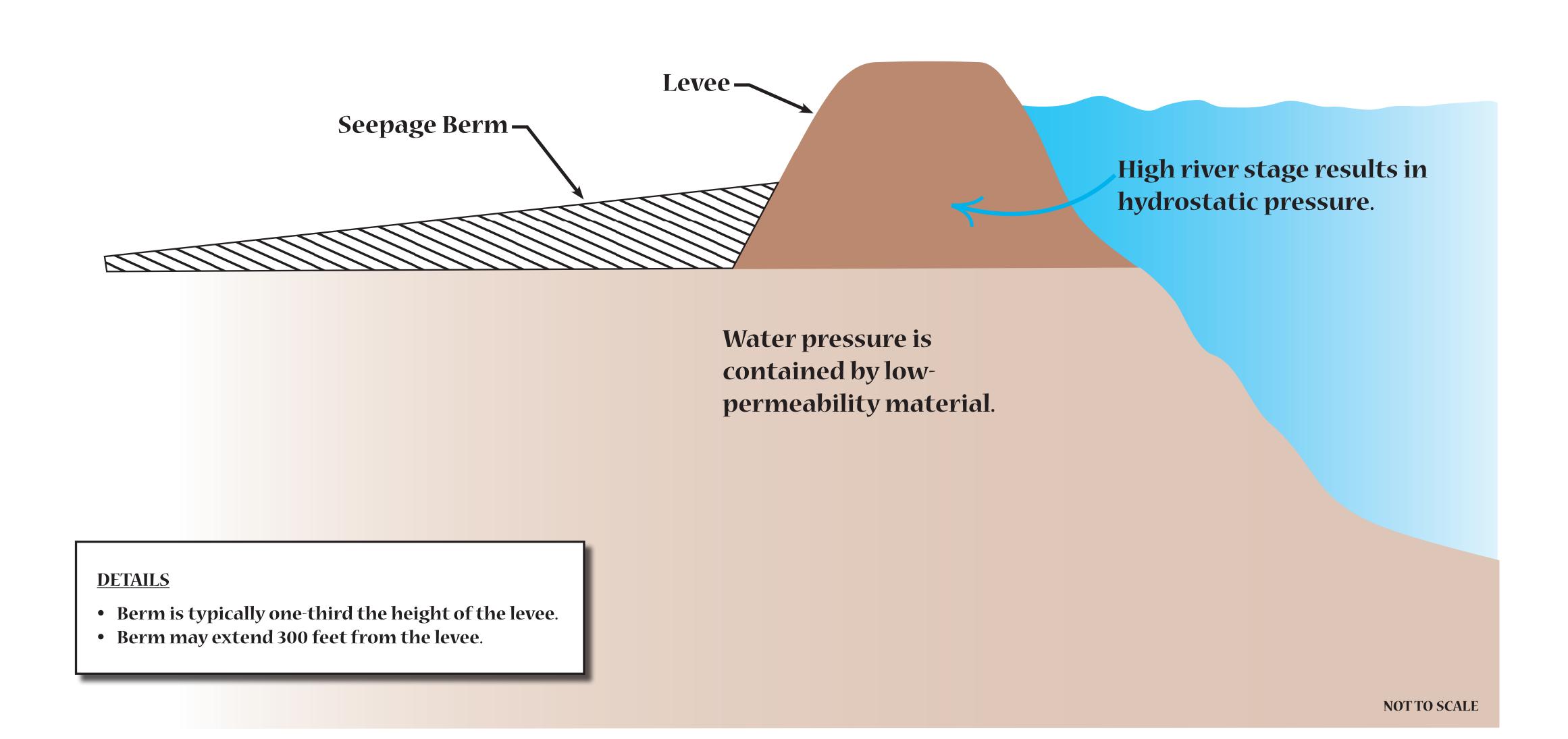


Stability Berm.indd 1

Seepage Berm

Concept:

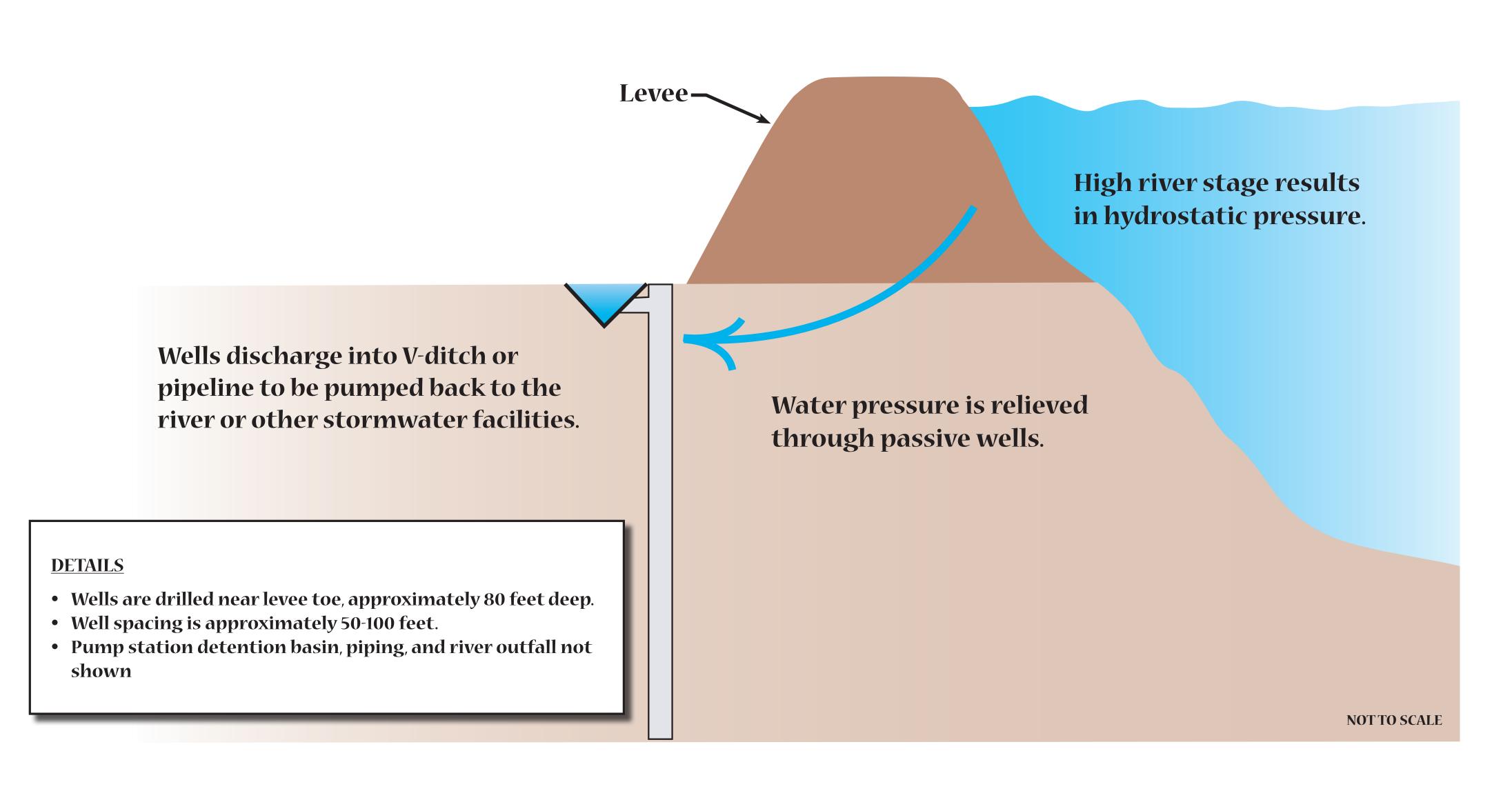
Water pressure is contained and dispersed by a thickened soil layer.



Relief Well

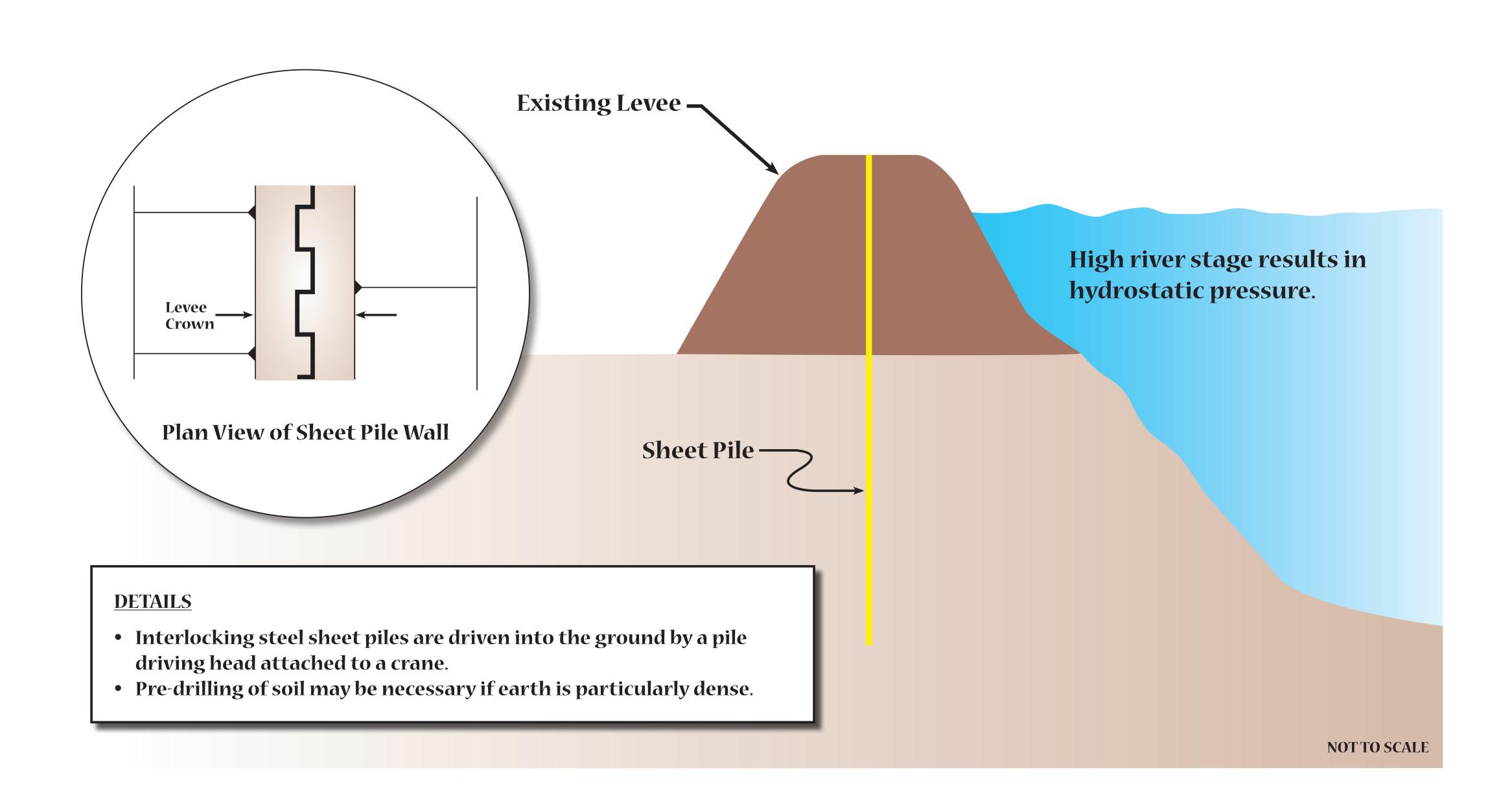
Concept:

Water pressure is relieved via passive wells, which direct water discharge into a collection system.



Sheet Pile Wall

Concept: Steel panels are driven into the levee core to provide a seepage barrier.



Slope Flattening

Concept:

Flatter slopes are more stable and less susceptible to erosion.

New material placed on landside of levee to create more stable slope. Existing material removed to create more stable slope.

DETAILS

- Slopes are repaired by reforming material on the landside (and waterside if necessary) to create flatter slopes.
- New material will meet current standards.

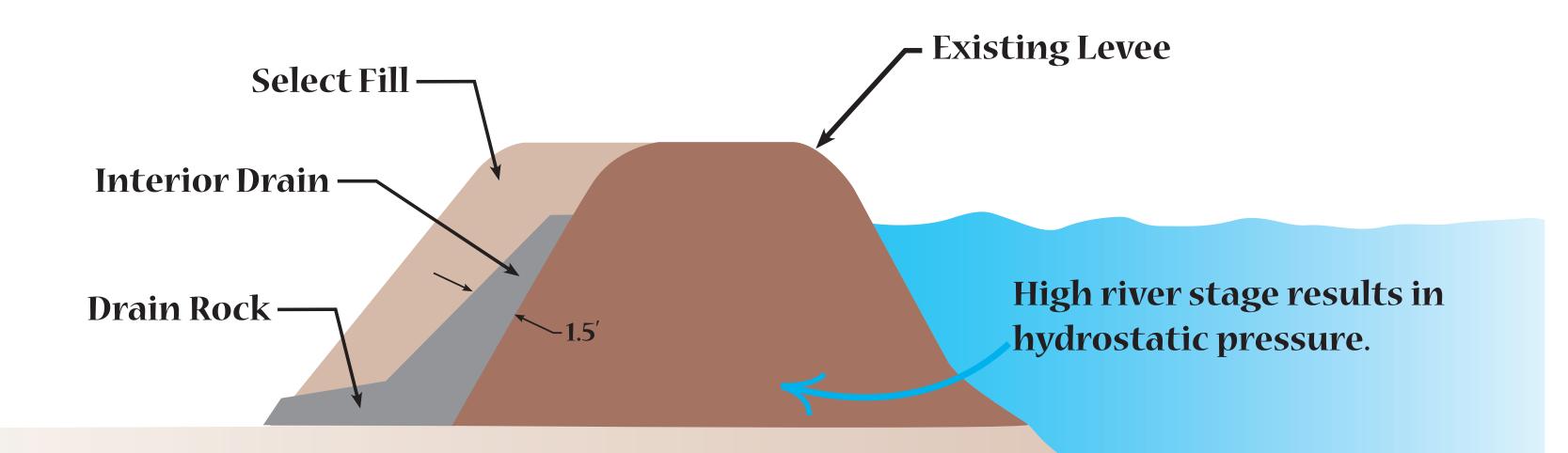
NOT TO SCALE

3F - Slope Flattening.indd 1

Internal Drain

Concept:

Capture any through-seepage and direct it away from the face of the levee.



DETAILS

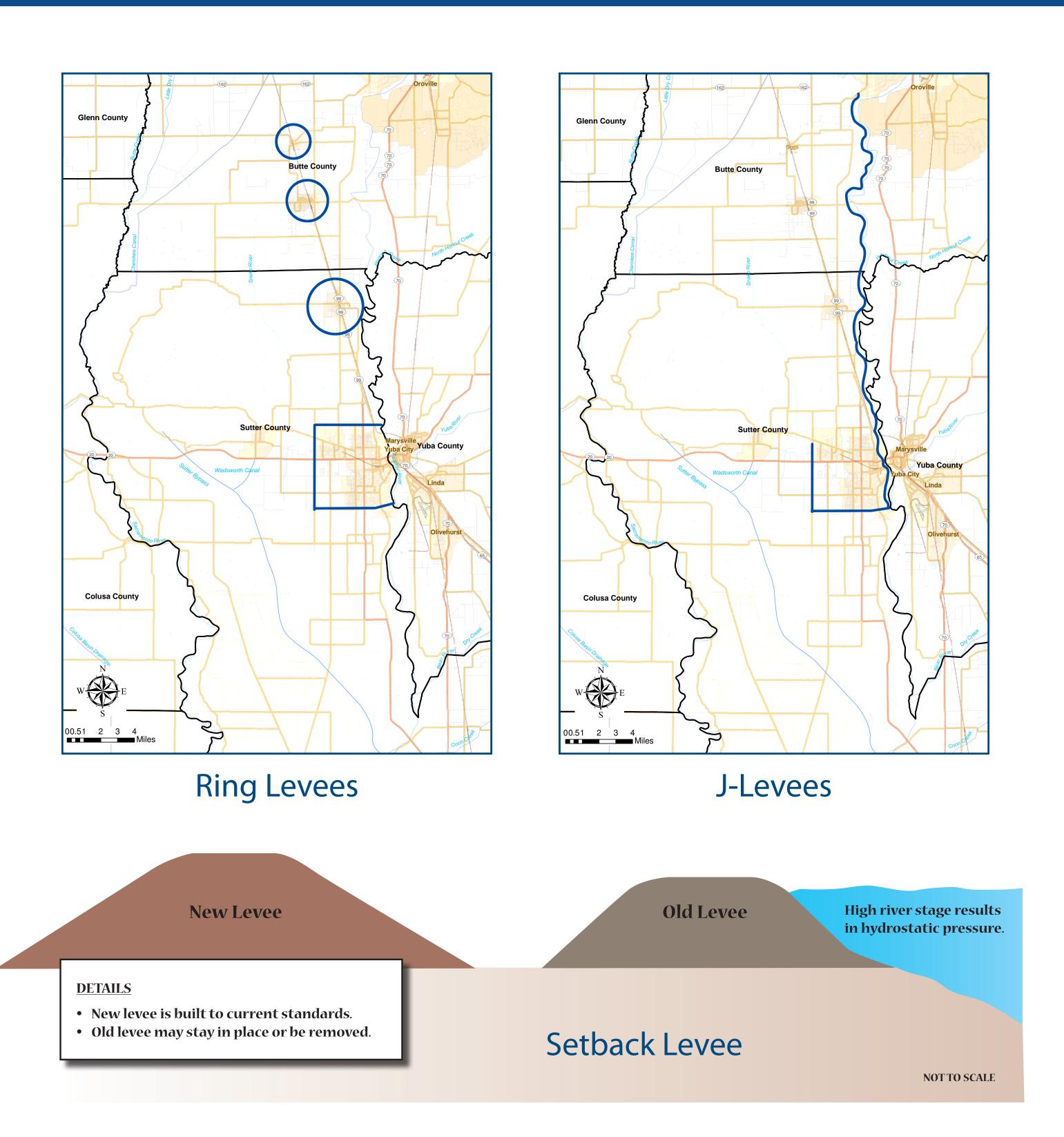
- Levee is partially excavated to install layers of drain rock encased in filter sand.
- Placed on the landside 1/3 of the levee.

NOT TO SCALE

New Levee Location

Concept:

A new levee is built where the existing levee is not readily repairable or where a change in the floodplain is an option (such as setback levees, ring levees, J-levees or similar concepts).



Reservoir Reoperation Flood Risk Management

Reduce flood risk by improving a reservoir's ability to store peak flood flows through a variety of operational or physical modifications.

Examples:

- Reallocate storage for flood risk management purposes.
- Utilize flood forecast based operations to release storage in anticipation of a flood event.

3I - Re-operation of Reservoirs.indd 1

Non-Structural Flood Risk Management

Non-structural measures reduce flood risk without significantly altering the nature or extent of the flooding. They do this by changing the use made of the floodplains, or by accommodating existing uses to the flood hazard.

Examples:

- Flood proofing
- Relocation of structures
- Flood warning/preparedness systems
- Regulation of floodplain uses

Ecosystem Restoration

Existing levees have isolated the floodplains from waterways, thereby eliminating significant floodplain habitats for native species, including Federally-listed species and other special-status species. There is potential to restore these areas in conjunction with flood risk management measures.

Examples:

- Realign levees to restore floodplains and river function
- Establish riparian/wetland habitat in conjunction with detention basins and other storage facilities
- Modify water inflow to select ponds to restore fish production and riparian/wetland habitats
- Convert nonnative habitats to native riparian/wetland habitats
- Eradicate exotic invasive plant species and establish native habitat

Recreation

An opportunity exists to create or enhance recreation features consistent with flood damage reduction and ecosystem restoration project features.

Examples:

- Multi-purpose paved trail on levee crown with access points, highway under crossings, public safety facilities, and appropriate signage
- Provide wildlife viewing platforms
- Picnic areas with associated parking and facilities
- Provide increased river access points

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Environmental Process

About NEPA & CEQA

It is anticipated the Sutter Basin Project and FRWLP will result in two separate environmental impact statements/ environmental impact reports (EIS/EIR)—one for each project. Both documents will disclose an activity's potential alternatives, potential effects, and proposed mitigation measures in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), respectively.

A joint EIS/EIR is prepared when there is both a Federal and state agency interest in an activity, and/or when a state agency needs permission to perform an action under Federal jurisdiction. The development of the draft joint EIS/EIR to evaluate the FRWLP is underway and scheduled for release in early 2012. The release date of USACE's draft joint EIS/EIR for the Sutter Basin Project has yet to be determined.

Scoping and Other Public Engagement

Scoping is a process used to inform the public of a proposed activity and provide an opportunity to give comment, insight, and local information related to the range of alternatives, environmental effects, and/or issues of concern related to the proposed activity.

Because the agencies are working to create two joint, albeit separate, environmental documents for these two projects, a joint scoping period is also being held. During the scoping process public input will be solicited about the scope of the environmental documents and the agencies will communicate with the public about the two efforts.

Scoping is particularly informative in a flood risk management project because the citizens of the effected community could have insight into the performance of a levee that the agencies are unaware of (think locations of under-seepage or boils or areas of general poor levee performance).

The comments received from public scoping will be used to inform development of the alternatives; defining the environment and resources potentially affected by the alternatives; and analysis of effects resulting from the alternatives. The affected environment broadly includes physical, biological, and social topic areas. Effects are identified and analyzed both for project construction and long-term operations and maintenance.

Potential Environmental Issues

The effect of a proposed activity on natural and built resources will be evaluated in the environmental documents for the Sutter Basin Project and the FRWLP. Resources analyzed in the EIS/ EIRs will include, but are not limited to:

- Transportation and Navigation
- Vegetation and Wetlands
- Socioeconomics and Environmental Justice
- Wildlife
- Fisheries and Aquatics
- Cultural Resources
- Air Quality, GHG and Climate Change
- Public Health and Environmental Hazards
- Land Use and Agriculture

Other Regulatory Compliance

USACE and SBFCA will need to comply with several regulations to complete the environmental process. Those could include:

Section 404: Establishes regulation of discharges of pollutants

• USACE grants 404 permits. The compliance mechanism is an Individual Permit, including 404(b)(1) alternatives analysis to identify least environmentally damaging practicable alternative (LEDPA)

Section 401: Requires certification that the project will not adversely affect water quality

Administered by State of California through the Regional Water Quality Control Board

Rivers and Harbors Act

- Section 14 of the Rivers and Harbors Act requires permission from USACE for alterations to Federal flood control projects
 - More commonly referred to as Section 408

Endangered Species Act

- Purpose is to protect species and the ecosystems upon which they depend
- Administered by two Federal agencies: NMFS and USFWS
- Section 7 requires Federal agencies to ensure any action authorized, funded, or carried out is not likely to jeopardize the continued existence of a listed species or modify their habitat
- If a listed species may be present, the agency must conduct a biological assessment (BA)
 - Analyzes the potential effects of the project on listed species and critical habitat
- NMFS/USFWS then determines a need for a biological opinion (BO) or letter of concurrence

National Historic Preservation Act

- Section 106: Requires consideration of resources eligible or potentially eligible for the National Register of Historic Places
 - Administered by California State Historic Preservation Officer (SHPO)

Fish and Game Code

- Section 1600 et seq.: Work on the waterside of the levee will require Streambed Alteration Agreement
- Section 2050 et seq.: Potential effects on listed species will require demonstration that effects have been fully mitigated or incidental take permit





Thank you for your interest in these two public safety projects. Please provide us with your input on the scope of the projects and the environmental analysis here.





Welcome to the

SUTTER BASIN PROJECT FEASIBILITY STUDY & FEATHER RIVER WEST LEVEE PROJECT

PUBLIC SCOPING MEETING

JUNE 27 & 28, 2011





PRESENTATION OUTLINE

- 1. Coordinated Flood Management Efforts
- 2. How Did We Get Here?
- 3. A Closer Look at Each Project
- 4. The Environmental Process





COORDINATED FLOOD MANAGEMENT EFFORTS





SUTTER BASIN PROJECT FEASIBILITY STUDY

- Led by U.S. Army Corps of Engineers (USACE)
- Initiated in 2001
- Purpose is to evaluate a Federal interest in flood risk management, ecosystem restoration, and recreation projects in study area
- Coordinating with Sutter Butte Flood Control Agency (SBFCA), Central Valley Flood Protection Board (CVFPB), and California Department of Water Resources (DWR)





FEATHER RIVER WEST LEVEE PROJECT (FRWLP)

- Led by local agency SBFCA
- Initiated upon approval of annual property assessment in 2010
- Purpose is to address levee deficiencies in the Feather River's west levee from Thermalito Afterbay to Sutter Bypass
- Construction start targeted for 2013
- SBFCA is coordinating with USACE, CVFPB, and DWR





A JOINT APPROACH

- Studied in coordination due to similar study areas, purpose, potential improvements, effects, and parties involved
- Separate but coordinated EIS/EIRs will be developed for each project
- USACE is NEPA lead and SBFCA is CEQA lead agency for environmental process, jointly coordinating with CVFPB and DWR





How DID WE GET HERE?





A BRIEF LOCAL HISTORY

- Before 1850, the Feather and Sacramento Rivers overflowed their banks in high-water periods every few years
- Sediment from hydraulic mining in the mid-1800s caused river beds to rise
- Levees were consequently privately constructed in late 1800s and early 1900s to combat primarily overtopping
- Levees were improved and incorporated under the Sacramento River Flood Control Project by USACE in early 1900s

A BRIEF LOCAL HISTORY (CONT.)

- Oroville Dam and Reservoir were completed in 1967, adding substantial flood storage
- New Bullards Bar Dam and Reservoir completed in 1970, adding substantial flood storage
- Flood risk is still present, with major events
- In 1955, breach on Feather River near Shanghai Bend (38 people killed)
- In 1986, break on Yuba River and slump on Sutter Bypass
- In 1997, breaches on Feather River and Sutter Bypass

RECENT FLOOD MANAGEMENT EFFORTS

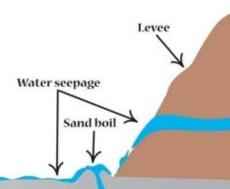
- Levee evaluation studies by USACE, DWR, and SBFCA have documented deficiencies in the system
- In 2010, property owners of Sutter and Butte Counties approved the formation of an assessment district to provide local funds for flood risk management





Through-seepage

High river levels lead to through-seepage in sandy soils. Through-seepage can dislocate soil material and cause sloughing and failure on the land-side of the levee slope.



Water level near flood-stage

CLAY BLANKET

INTERMIXED SAND AND GRAVELS

Under-seepage

High river levels lead to under-seepage through sandy and gravelly soils. An area of high water pressure beneath the clay blanket at the land-side levee toe can cause water seepage and sand boils.

A CLOSER LOOK AT EACH PROJECT





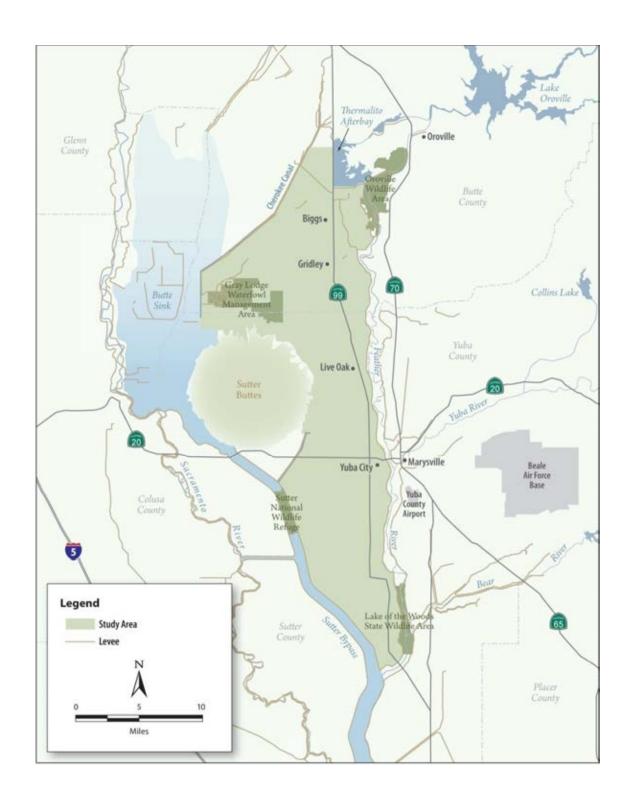
SUTTER BASIN PROJECT FEASIBILITY STUDY: STUDY AREA

- Study area encompasses ~284 sq. miles and is nearly encircled by Federal Project levees
- Includes portions of Sutter and Butte Counties
- About 44 miles long and 9 miles wide
- Feather River to the east and the Cherokee Canal, Wadsworth Canal, Sutter Buttes, and Sutter Bypass to the west





SUTTER BASIN PROJECT STUDY AREA



SUTTER BASIN PROJECT FEASIBILITY STUDY: PROBLEMS AND POTENTIAL MEASURES

- Levees are at risk due to under- and through-seepage and overtopping
- Study will evaluate measures including: re-operation of reservoirs, improvements to existing levees, building new levees, and other storage & conveyance options
- Ecosystem restoration would include restoration of floodplain function and habitat

SUTTER BASIN PROJECT FEASIBILITY STUDY: POTENTIAL ALTERNATIVES & FUNDING

- Potential alternatives include those that comprise flood risk management, ecosystem restoration, and recreation measures
- Funding for the feasibility study phase only is cost-shared, 50% Federal (USACE) and 50% non-Federal (SBFCA and CVFPB)





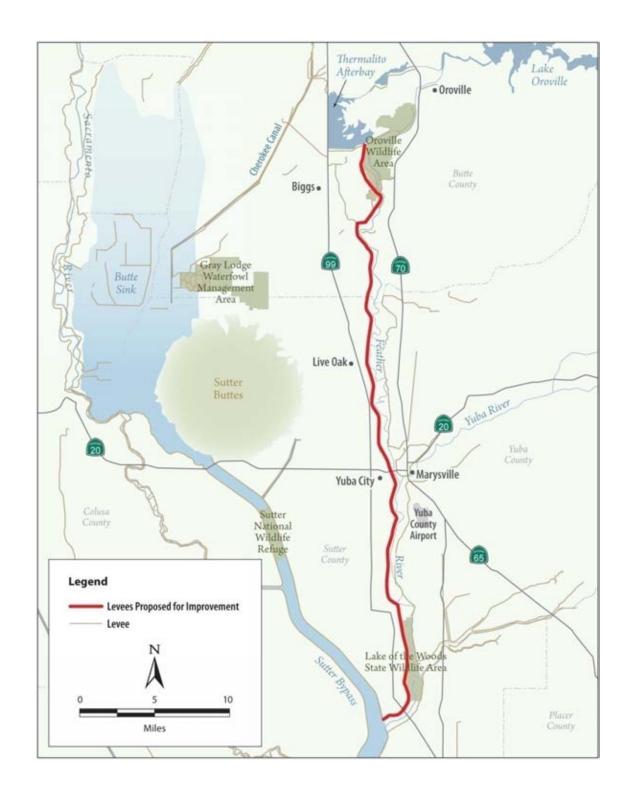
FEATHER RIVER WEST LEVEE PROJECT: STUDY AREA

- Will improve 44-miles of levees from the Thermalito Afterbay to the Sutter Bypass
- Provides flood risk management benefits to Live Oak, Biggs, Gridley, and Yuba City and unincorporated areas





FEATHER RIVER WEST LEVEE PROJECT STUDY AREA



FEATHER RIVER WEST LEVEE PROJECT: PROBLEMS AND POTENTIAL MEASURES

- Primary deficiencies include through seepage and under-seepage
- Measures may include slurry walls, seepage berms, stability berms, internal drains, relief wells, sheet-pile walls, slope flattening, and new levee alignments





FEATHER RIVER WEST LEVEE PROJECT: FUNDING

- The project cost is estimated at \$300 million
- The state is expected to pay as much as 76% of project costs
- Locals (within assessment district) will pay the remaining share through annual assessment (anticipated to be in effect for 33 years)





THE ENVIRONMENTAL PROCESS





NEPA & CEQA

- NEPA (Federal) and CEQA (state) are both processes that require:
 - Analysis and disclosure of an activity's potential effect on the natural and built environments
 - Identification of alternatives and mitigation measures to reduce effects
- Processes may necessitate an EIS and EIR depending on potential effects (type and degree)

JOINT EIS/EIR

- Prepared when there is both a Federal and state agency interest in an activity, and/or
- When a state lead agency needs permission to perform an action under Federal jurisdiction (Section 408 permission & Section 404 permit)
- Agencies partner to analyze effects in a joint EIS/EIR and disclose an activity's potential effects





WHAT IS SCOPING?

 Scoping is a process used to inform the public of the proposed activity and provide an opportunity to give input on the range of alternatives, potential environmental effects, and any issues of concern related to the proposed activity





SCOPING PERIOD

- May 20, 2011 to July 8, 2011
- Comments will be accepted via e-mail, fax, and USPS
- Comments must be postmarked, faxed, or time-stamped (email) before or on July 8, 2011





WAYS TO COMMENT

- Via E-mail
- Facsimile
- Via U.S. Postal Service
- Today via written comment (see comment cards)
- Provide oral comments to court reporter





CONTACT INFORMATION

Mail or E-mail comments to:

Matt Davis U.S Army Corps of Engineers 1325 J Street Sacramento, CA 95814 Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

Phone: 916–557–6708 *Fax:* 916–557–7856

Phone: 916–737–3000 *Fax:* 916–737–3030

Matthew.G.Davis@usace. army.mil

inorgaard@icfi.com





THANK YOU FOR ATTENDING







Coordinated Environmental Analysis

It is anticipated the Sutter Basin Project and FRWLP will result in two separate environmental impact statements/ environmental impact reports (EIS/EIR)—one for each project. Both documents will disclose alternatives, potential effects, and proposed mitigation measures in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. A joint EIS/EIR is prepared when there is both a Federal and state agency interest in an activity, and/or when a state agency needs permission to perform an action under Federal jurisdiction.

Development of the draft EIS/EIR to evaluate the FRWLP is underway and scheduled for public release in early 2012. A public release date for the Sutter Basin Project draft EIS/EIR has yet to be determined.

The Scoping Process

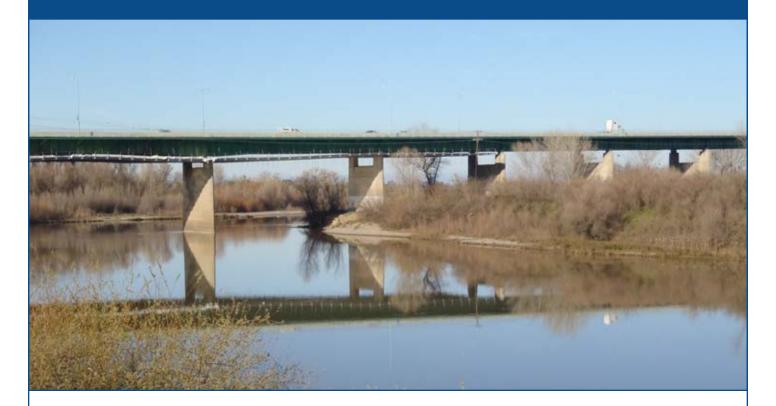
USACE and SBFCA are working together to combine and coordinate this public scoping process for their two separate environmental documents.

Scoping is a process in which agencies inform the public of a proposed activity and provide an opportunity for public input on the range of alternatives, environmental effects, and issues of concern related to the proposed activity. It also allows agencies to gather insights and local information from the public related to the activity.

Comments received from this public scoping period will be used to inform development of the alternatives; define the environment and resources potentially affected by the alternatives; and analyze effects resulting from the alternatives. The affected environment broadly includes physical, biological, and social topic areas. Effects will be identified and analyzed both for project construction and long-term operations and maintenance. The scoping period is from May 20, 2011 to July 8, 2011.

For more information on these efforts, visit www.spk.usace.army.mil or www.sutterbutteflood.org.

Sutter Basin Project and Feather River West Levee Project



The U.S. Army Corps of Engineers (USACE) and the Sutter Butte Flood Control Agency (SBFCA), in coordination with the California Department of Water Resources (DWR) and the California Central Valley Flood Protection Board (CVFPB), are undertaking two related efforts to study flood risk management measures in Sutter and Butte Counties. USACE is leading a feasibility study for the Sutter Basin Project to determine Federal interest in flood risk management in conjunction with other related purposes in the Sutter Basin study area, while SBFCA is leading the Feather River West Levee Project (FRWLP) to address deficiencies in 44 miles along the west levee of the Feather River.

USACE and SBFCA are studying these two projects in close coordination because they are related in their study areas, purpose, potential measures, and potential effects.







A Closer Look at the Two Projects

The Sutter Basin Project Feasibility Study

In 2000, the State of California and USACE entered into a cost-sharing agreement to initiate a feasibility study within the Sutter Basin. An amendment of the cost-sharing agreement was signed in July 2010 to include SBFCA as a non-Federal sponsor. The purpose of the feasibility study is to address flood risk management, ecosystem restoration, and recreation issues in the study area.

The Sutter Basin Project feasibility study evaluates approximately 285 square miles that are roughly bounded by the Feather River, Sutter Bypass, Wadsworth Canal, Sutter Buttes, and Cherokee Canal. The study area is essentially encircled by project levees and the high ground of the Sutter Buttes. Past flood events and geotechnical analysis show these levees have a higher probability of failure related to through-and under-seepage than levees designed to meet current standards. Additionally, the levees are at risk of overtopping from floods greater than they are designed to withstand.

As part of the Sutter Basin Project feasibility study, USACE is evaluating a variety of flood risk management measures that could include re-operation of reservoirs; improvements to existing levees; construction of new levees; other storage, conveyance, and non-structural options; and measures that could potentially restore the



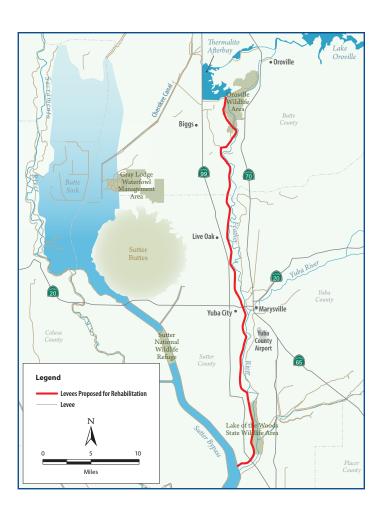
ecosystem within the study area and develop or expand recreation facilities. This study will be the basis for a recommendation to Congress to address water resources and related issues within the study area. The feasibility study phase of this project is cost-shared: USACE will fund 50%, and SBFCA and the State of California will fund the remaining 50%.

deficiencies found along 44 miles of the Feather west levee from the Thermalito Afterbay south t

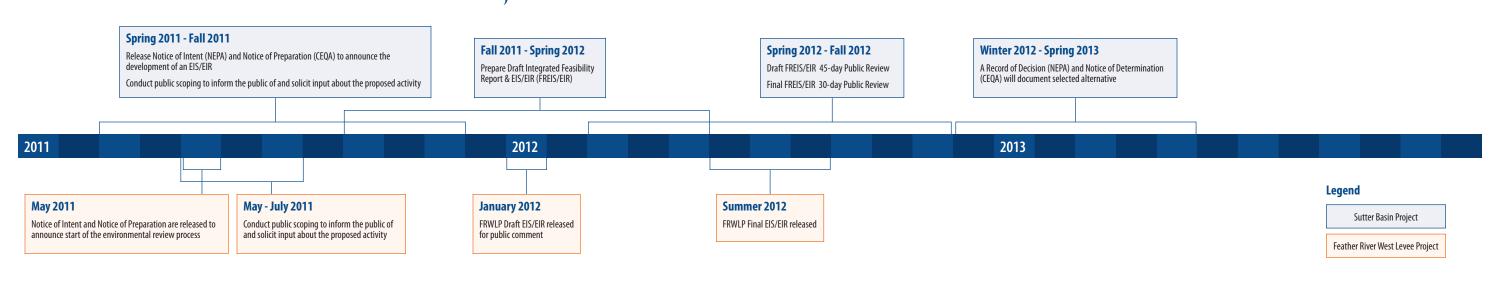
SBFCA is planning the FRWLP to address levee deficiencies found along 44 miles of the Feather River's west levee from the Thermalito Afterbay south to the Sutter Bypass. The west levee provides flood risk management benefits to the cities of Yuba City, Gridley, Live Oak, and Biggs, and portions of Butte and Sutter Counties. Measures are being evaluated to meet Federal, state, and local flood protection criteria and goals.

The Feather River West Levee Project

The west levee is at risk of failure from through- and under-seepage and from overtopping caused by floods greater than the levee is designed to withstand. Alternatives to repair these deficiencies could include slurry walls, seepage berms, stability berms, internal drains, relief wells, sheet-pile walls, slope flattening, and new levee alignments. The goal is to construct the FRWLP as quickly as possible, in advance of and compatible with the Sutter Basin Project, potentially in 2013.



Environmental Review Process Timeline for the Sutter Basin Project and FRWLP



Sutter Basin Project & Feather River West Levee Project



June 27, 2011 Scoping Meeting Comment Card

			Date	2:
Name:		Title:_		
Phone:	Fax:	Affi	liation:	
Email:	Street	Address		
City:		State:	Zip:	
Please add me to the m	ailing list to receive future up	odates.		
provide your input in the spreport (EIS/EIR) for the Sutte	e Sutter Basin Project and Fea pace below about the content er Basin Project and/or for the card in one of the designated	t of the environme EIS/EIR for the FR'	ental impact statement/e WLP. After you've writte	nvironmental impac n your comments in

Sutter Basin Project & Feather River West Levee Project



June 28, 2011 Scoping Meeting Comment Card

			Date	2:
Name:		Title:_		
Phone:	Fax:	Affi	liation:	
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City:		State:	Zip:	
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provide your input in the spreport (EIS/EIR) for the Sutte	e Sutter Basin Project and Fea pace below about the content er Basin Project and/or for the card in one of the designated	t of the environme EIS/EIR for the FR'	ental impact statement/e WLP. After you've writte	nvironmental impac n your comments in

Attachment C

- Comments received from all interested parties (including those transcribed by court reporter)
- Attendee sign-in sheet templates

Sutter Basin Project & Feather River West Levee Project



June 27, 2011 Scoping Meeting Comment Card

		¥			Date: () (7
Name:	Douglas	Gault		Title: Dinecto	- of public Wo
Phone:		Fax:		Affiliation:	Sittle County
Email:_		Street	Address		
City:			State:	Zip:	
☐ Ple	ase add me to the ma	ailing list to receive future up	dates.		
provide report (the spa Please)	e your input in the spa (EIS/EIR) for the Sutte ce below, place this c write legibly.	ace below about the content or Basin Project and/or for the eard in one of the designated	t of the enviro EIS/EIR for th I baskets arou	onmental impact stat ne FRWLP. After you'd and the room or hand	VLP) scoping meeting. Please tement/environmental impact we written your comments in dit to a project team member.
	Ime	Feasibility Fication must to allow funding for	Sta	HE TO VE	<u>lear</u> e
	Keep on s	the proces	es for	- fearlo	ility study

ORIGINAL

SUTTER BASIN PROJECT FEASIBILITY STUDY & FEATHER RIVER WEST LEVEE PROJECT PUBLIC SCOPING MEETING û YUBA CITY, CA

DATE:

June 27, 2011

TIME:

3:30 p.m. and 6:30 p.m.

REPORTED BY:

Jillian Bassett

Certified Shorthand Reporter No. 13619



Northern California Court Reporters

Certified Shorthand Reporters & Legal Photocopy (916) 485-4949 ■ Fax (916) 485-1323 ■ (888) 600-NCCR 1325 Howe Avenue, Suite 105 ■ Sacramento, CA 95825 nccr@norcalreporters.com ■ www.norcalreporters.com

6/27/2011 ICF Inertrational

STAN CLEVELAND, COUNTY SUPERVISOR:

I was told to repeat the comment I made regarding including the DWR Corridor Management Project, which is called The Lower Feather River Corridor Management Project. And there's a management group, and then there's -- I forgot what the other one is; there's two groups. And Aecom, they're the project, I guess, engineer group for that. And making sure that that is coordinated with this here. Because in that corridor of the Feather River, they're doing a lot of environmental planning and setting a foundation, or a level base, to where everybody won't have to come back and start from scratch on any of their studies -- environmental studies.

1.9

Northern California Court Reporters (916) 485-4949 * Toll Free (888) 600-6227

Certificate of Certified Shorthand Reporter The undersigned certified shorthand reporter of the state of California does hereby certify: That the foregoing deposition was taken before me at the time and place therein set forth, at which time the witness was duly sworn by me; That the testimony of the witness and all objections made at the time of the examination were recorded stenographically by me and thereafter transcribed, said transcript being a true copy of my shorthand notes thereof. In witness whereof, I have subscribed my name this Certificate number

ORIGINAL

SUTTER BASIN PROJECT FEASIBILITY STUDY & FEATHER RIVER
WEST LEVEE PROJECT PUBLIC SCOPING MEETING û GRIDLEY, CA

DATE:

June 28, 2011

TIME:

3:30 p.m. and 6:30 p.m.

REPORTED BY:

Jillian Bassett

Certified Shorthand Reporter No. 13619



Northern California Court Reporters

Certified Shorthand Reporters & Legal Photocopy (916) 485-4949 ■ Fax (916) 485-1323 ■ (888) 600-NCCR 1325 Howe Avenue, Suite 105 ■ Sacramento, CA 95825 nccr@norcalreporters.com ■ www.norcalreporters.com DAVID NEUBERT:

I live in Sutter County. I was speaking with your colleagues, and they mentioned one of the options they're looking at is a levee setback in the area of Nelson slough along Sacramento Avenue in Sutter County. And this would be the area between the Sacramento bypass and the Feather River, right where the Feather River enters the bypass. There's, I don't know, maybe 900,000 acres there that they could sort of cut the corner on the levee the way it exists now, and pick up 1,000 acres of floodplain.

And I'm just -- I think that's a great idea.

There's -- I think there might be one house, and it's probably just a rental in that area. So you probably wouldn't have a lot of homeowners that would be hopping mad. And you'd probably pick up 10 or 15,000 acre-feet of flood storage. So it would be something, I think, that would -- engineering-wise, it would be an interesting levee setback to look at.

So the other thing that I think that as a resident of Sutter County, and I live in the LD-1 area -- I'm not sure if LD-1 has the capacity -- management capacity to pull something like that off. You know, maybe setting up something like

6/28/2011 ICF International

1	trilla (phonetic) like they did in Yuba County. Or maybe
2	this super agency, the Sutter Butte Agency, could do it.
3	But I just I just don't think management
4	capacity, or I should say the planning capacity of the
5	board level I think the management, the managers of
6	LD-1 are fine. But the board, I don't think, has vision
7	for projects like this. So hopefully they do.
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RICHARD KUCEK:

I guess it goes back to the building of the levee was our first project for the taxpayers to protect everybody from flooding. Okay. They knew after '55 when they finished the levee and had to break in Yuba City, that that wouldn't solve the problem. So they took -- and I wouldn't say they use -- it had scare tactic. But they got the taxpayers to fund another project which was get the dam at Lake Oroville. And the state of California, at that time, from what I understand, did not have enough money to build it. But the taxpayers voted it in, so it went on their tax board. But Southern California funded most of the money for building that in return for surplus water out at the lake.

And somewhere down the line it got turned around that I guess the water's worth more than the people in the houses. So they keep the lake elevation too high. But if they would keep it down, we would never need these projects that they're proposing today, which would be the third ones the taxpayers are going to pay for just for protection.

And like, the slurry would be the right way to fix this right now. If they went with the berm, that would cause a lot of problems, because there would be

6/28/2011 ICF International

maintenance, and they can't maintain the levees that there are right now. You can go out there and look at it; kids drive up and down on it, there's gophers and squirrels on it and everything else. And they don't spray it. They don't kill the weeds. They don't do nothing. So if they do, I guess that setback levee, that wouldn't cause a lot more problems on the east side of it, and then what do you do with that? Because you got to be in the floodplain. But the berm, to me, would be too expensive to keep in 33 years.

So I don't know how they got as far as they did with this project. But it should never happen because the taxpayers shouldn't have to pay three times for flood protection.

So I don't know. I guess we'll just go to the meetings and see how it comes out and, you know, if they're going to do all this, and Southern California has the right to all that water, why don't they pay the bills? I mean, why should we have to pay it? If they want to keep that lake full enough so it enables us from flooding, they should have to pay the bill if it does flood. Not raise our taxes and everything else, and our flood insurance, and they get all the water, and we got the bill.

6/28/2011 ICF International

BOB BARKHOUSE:

Two concerns I have is the east levee of the Sutter bypass, because, in my lifetime, on the west side -- I've had to live through two floods -- farmland on the other side -- major floods. Those levees on the west side -- east side are no better than west side, yet we're trying to contain the overflow from the Sacramento River between bypass. And we certainly are subject to flooding if the right condition --

And then my second concern was the maps continuously show a perimeter levee around Yuba City, or a J levee on the south and west side. And I'm concerned about building a levee around Yuba City and putting the city of Yuba City in the same parallel as the city of Marysville. Although Marysville has never flooded, but it's always -- the bowl is likely to fill up someday, and it would be a catastrophe.

But I am concerned about that part. They have a strong levee on the Feather River, and let that take care of itself. So that was my two concerns.

-	Certificate
2	of
3	Certified Shorthand Reporter
4	The undersigned certified shorthand reporter of the
5	state of California does hereby certify:
6	That the foregoing deposition was taken before me at
7	the time and place therein set forth, at which time the
8	witness was duly sworn by me;
9	That the testimony of the witness and all objections
10	made at the time of the examination were recorded
11	stenographically by me and thereafter transcribed, said
12	transcript being a true copy of my shorthand notes thereof.
13	In witness whereof, I have subscribed my name this
14	date July 25 acil.
15	
16	
17	- JUL BUSIA
18	Certificate number 13019
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Sutter Basin Project & Feather River West Levee Project

June 27, 2011 Scoping Meeting Sign-in Sheet



Name	Title	Affiliation	Street Address	City	Zip Code	How did you hear about the meeting?

Sutter Basin Project & Feather River West Levee Project

June 28, 2011 Scoping Meeting Sign-in Sheet



Name	Title	Affiliation	Street Address	City	Zip Code	How did you hear about the meeting?

Comments Received During the Scoping Period

[Excluding comments received at the scoping meetings. See Appendix D for those comments.]

E.1 Public Feedback

Seventeen comments were received apart from feedback received (comments and transcripts from oral comments) at the two scoping meetings. See Appendix D to view comments received at the scoping meetings.

Below is a list summarizing comments received.

- 1. Project lead agencies must obtain appropriate water quality/discharge permits including those related to dewatering, discharge, sewer, and construction and land disturbance.
- 2. The area being studied is located in the planning area of the Yuba/Sutter Habitat Conservation Plan/Natural Community Conservation Plan (HCP/HCCP); therefore please provide the Sutter County Community Services Director's office with all future notices regarding this project.
 - a. The applicants currently are the Counties of Yuba and Sutter, the City of Wheatland, the City of Live Oak, and Yuba City. These agencies are available to provide additional information upon request.
- 3. Project teams need to review the current effective Flood Insurance Rate Maps for all counties and cities in the study area. Please note that these cities and counties are participants in the National Flood Insurance Program (NFIP) and the minimum, basic NFIP floodplain management building requirements are described in 44 Code of Federal Regulations (CFR) §§59–65.
- 4. General requests for more detailed information about the boundaries of each project and the relationship between the two projects.
- 5. A request to memorialize, in some way, the unreported deaths in 1955 caused by a levee break at Shanghai Bend.
- 6. The California State Lands Commission (CSLC) requests that as the Project proceeds, the Sutter Butte Flood Control Agency (SBFCA) submits additional information (e.g., detailed maps) to enable CSLC staff to determine if any components of the Project will require a lease or permit. CLSC additionally requests to be placed on any future distribution mailing list for the Project. A thorough project description should be included in the environmental impact statement/environmental impact report (EIS/EIR) in order to facilitate meaningful environmental review of potential impacts, mitigation measures, and alternatives. A thorough description will facilitate CSLC staff's determination of the extent and location of its leasing jurisdiction, make for a more robust analysis of the work that may be performed, and minimize the potential need for subsequent environmental analysis.
- 7. The project's EIS/EIR should carefully issues and mitigation alternatives in order to formulate a more comprehensive and sustainable approach to flood management in the Sutter/Butte region, as described below. These include:

- a. Growth Inducing Impacts—Consider whether providing 200-year flood protection would increase rather than decrease flood risk by incentivizing development in these flood prone areas.
- b. Downstream Flood Impacts—Proposed project could route more floodwater downstream to urban communities.
- c. Impacts Under Climate Change—Will levee improvements really provide 100–200 year protection?
- d. Evaluate a Broader Range of Alternatives—Levee Setbacks, Ring Levees and Building Modifications, Flood Bypass, Oroville Reservoir, Oroville Wildlife Area Levee Modification.
- 8. From the Feather River Air Quality Management District (AQMD): Recommends regarding the air quality and climate change for both projects. The EIS/EIR should include a discussion of greenhouse gas emissions and climate change impacts. The following District Rules and Regulations May apply:
 - a. Rule 3.0 Visible Emissions.
 - b. Rule 3.16 Fugitive Dust Emissions.
 - c. Rule 4.1 Permit Requirements.
- 9. The project should submit a Fugitive Dust Control Plan to the Feather River AQMD prior to beginning work. The California Department of Fish and Game (CDFG) would like to emphasize the critical importance of coordination with CDFG during the California Environmental Quality Act (CEQA) and regulatory processes and asks that SBFCA and the U.S. Army Corps of Engineers (USACE) evaluate CDFG's comments closely to ensure that impacts are avoided, minimized and mitigated pursuant to the CEQA and the appropriate regulations and statutes:
 - a. CDFG Authority—Commenting as Trustee Agency, landowner and conservation easement holder within the study area for both projects.
 - b. California Endangered Species Act (CESA) Species—CDFG has identified species with potential to occur within the study area that may be affected by the projects. (See Attachment with List of Species.)
 - c. Threatened and Endangered Plants—EIS/EIRs should include a full impact assessment.
 - d. Other Species Considerations—Emphasis on describing and identifying locations of existing resources within the study area that are rare or unique.
 - e. Lake or Streambed Alteration Agreement—Backfilling of a pond could be a solution to reducing levee permeability. EIS/EIRs should identify ponds and measures required to reduce an impact to below a level of significance.
 - f. Other Habitat Considerations—Recommends the projects be designed to avoid impacts to wetlands and riparian habitat as much as possible.
 - g. CDFG Lands, Restoration Efforts and Public Use—Identify lands subject to conservation easements in the study area and ensure that the projects are implemented consistent with the conservation easement terms.
 - h. Other Considerations—Identify clear windows of construction, and other measures to minimize impact to wildlife and the recreating public. Detailed monitoring for all mitigation

measures. CEQA filing fees due at the time of the Notice of Determination (NOD) for final EIS/EIRs.

- 10. To adequately assess and mitigate project-related impacts to archaeological resources, the Native American Heritage Commission (NAHC) recommends the following actions:
 - a. Contact the appropriate regional archaeological Information Center for a record search.
 - b. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
 - c. Contact the NAHC for sacred lands file check and a list of contacts.
 - d. Lack of surface evidence of archeological resources does not preclude their subsurface existence.
 - e. Information presented at the scoping meetings and in the Notice of Preparation (NOP) was vague. Support for the development of a levee setback area near the confluence was voiced because this land is currently used for agriculture and USACE could minimize land acquisition costs by simply utilizing a flood easement rather than land purchase if the levee is moved north to widen the flood plan.
 - f. The sharing of hydraulic models and other findings of levee setback options and costs as they are developed.
- 11. Keep the public informed about the following topics:
 - a. The legal basis for the construction or improvement of levees, on each segment of levee, and include this in the documents.
 - b. The extent to which the levee districts are obligated to provide for cross-levee access for private owners and the public; and, the extent to which the levee districts have a right to exclude underlying owners, owners of land on the water-side of the levee, and the public, from being on or crossing the levees
 - c. Address the question of who owns the segments of land the levee sits on; what basis the levee district claims the right to maintain a levee on each segment; what extent the levee district may have the right to exclude land-owners and members of the public; and what extent is the burden of the levee district to build and maintain ramps to allow private owners or the public to cross the levee.
 - d. The legal effect of the documents and general law on whether levee deeds are read as fee grants or mere easements; who is obligated to maintain ramps providing access across the levee; under what circumstances might the levee district be obligated to construct or maintain a ramp; when may the levee district exclude the underlying owner, owners inside the levee, or the public from crossing the levee.
 - e. The tops of the levees were open for use apparently as public roads. What happened to rights which might have existed by dedication, grant, or county road action?

E.2 Next Steps

All comments received, both those at the scoping meetings and those received during the scoping period, will assist in determining which issues are evaluated in detail in both the Sutter Basin Project and Feather River West Levee Project (FRWLP) EIS/EIRs. Once alternatives have been developed based on the scoping process and preexisting information, they will be analyzed, and draft EIS/EIRs will be developed.

Upon the release of the draft EIS/EIR, the public will have 45 days to comment on the document. Additionally, at least one public hearing will be held so the public and agencies can learn more about both of the draft EIS/EIRs, ask questions regarding the analysis, and provide comments. At these meetings, the alternatives will be presented and explained.

Development of the draft EIS/EIR to evaluate the FRWLP is underway and scheduled for public release in 2012. A public release date for the Sutter Basin Project draft EIS/EIR has yet to be determined.



SUTTER COUNTY COMMUNITY SERVICES DEPARTMENT

Animal Control Building Inspection Environmental Health Planning

Director – Larry Bagley Assistant Director – Randy Cagle Fire Services – Dan Yager Emergency Services – John DeBeaux

CERTIFIED AND FIRST CLASS MAIL

June 8, 2011

Ingrid Norgaard, Project Manager Sutter Buttes Flood Control Agency 630 K Street, Suite 400 Sacramento, CA 95814

Matt Davis, Environmental Resources Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, CA 95814

Re: Response to the Notice of Preparation of an EIS/EIR for the Sutter Basin Feasibility Study and Feather River West Levee Project

Dear Ms. Norgaard and Mr. Davis,

Thank you for the opportunity to comment on the Notice of Preparation for the EIS/EIR on the Sutter Basin Feasibility Study and Feather River West Levee Project. The County of Sutter, County of Yuba, City of Yuba City, City of Live Oak, City of Wheatland, California Department of Fish and Game ("DFG") and the United States Fish and Wildlife Service ("USFWS") are in the process of preparing the Yuba-Sutter Natural Community Conservation Plan and Habitat Conservation Plan ("Yuba-Sutter NCCP/HCP"). The area you are studying is located in the planning area of the Yuba/Sutter NCCP/HCP; therefore please provide our office with all future notices regarding this project.

Sincerely,

LARRY BAGLEY

COMMUNITY SERVICES DIRECTOR

LB:tsg

cc: Yuba-Sutter NCCP/HCP Working Group Members

H:\My Doc, ..\2011 Corr...\NCCP_SBFCA NOP response_6-8-11

U.S. Department of Homeland Security FEMA Region IX 1111 Broadway, Suite 1200 Oakland, CA. 94607-4052



June 9, 2011

Ingrid Norgaard, Project Manager Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, California 95814

Dear Ms. Norgaard:

This is in response to your request for comments on the Notice of Preparation of Draft Environmental Impact Statements/Environmental Impact Reports for the Sutter Basin Feasibility Study and Feather River West Levee Project.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the Counties of Butte (Community Number 060017) and Sutter (Community Number 060394), and Cities of Biggs (Community Number 060437), Gridley (Community Number 060019), Yuba City (Community Number 060396), and Live Oak (Community Number 060395). Please note that the above referenced Cities and Counties are participants in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.
- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any development must not increase base flood elevation levels. The term development means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials. A hydrologic and hydraulic analysis must be performed prior to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

Ingrid Norgaard, Project Manager Page 2 June 9, 2011

> Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The City of Gridley floodplain manager can be reached by calling Jerry Ann Fichter, Mayor, at (). The City of Biggs floodplain manager can be reached by calling Paul H. Pratt, Public Works Superintendent, at (530) 868-1396. The Sutter County floodplain manager can be reached by calling Douglas R. Gault, Director, Department of Public Works, at (530) 822-7450. The Yuba City floodplain manager can be reached by calling George Musallam, Director, Department of Public Works, at (530) 822-3288. The City of Live Oak floodplain manager can be reached by calling Bruce Nash, City Engineer, at (530) 895-1442. The Butte County floodplain manager can be reached by calling Mike Crump, Director, Department of Public Works, at (530) 538-7681.

If you have any questions or concerns, please do not hesitate to call Cynthia McKenzie (510) 627-7190 and/or Frank Mansell (510) 627-7191 of the Mitigation staff.

Sincerely,

Gregor Blackburn, CFM, Branch Chief Floodplain Management and Insurance Branch Ingrid Norgaard, Project Manager Page 3 June 9, 2011

cc:

Jerry Ann Fichter, Mayor, City of Gridley
Paul H. Pratt, Public Works Superintendent, City of Biggs
Douglas R. Gault, Director, Department of Public Works, Sutter County
George Musallam, Director, Department of Public Works, Yuba City
Bruce Nash, City Engineer, City of Live Oak
Mike Crump, Director, Department of Public Works, Butte County
Raul Barba, State of California, Department of Water Resources, Northern Region Office
Ray Lee, State of California, Department of Water Resources, North Central Region Office
Cynthia McKenzie, Senior Floodplanner, CFM, DHS/FEMA Region IX
Frank Mansell, Floodplanner, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX



July 5, 2011

Ingrid Norgaard, Project Manager Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

Dear Ms. Norgaard,

American Rivers, in its commitment to river conservation, public safety, and sustainable flood management, would like to offer comments with respect to the proposed Feather River West Levee Project (FRWLP). It is American Rivers' concern that the project, as currently proposed, fails to incorporate long-term, sustainable flood management strategies, and places both human and natural communities at increased risk of future catastrophic flooding.

The project's EIR/EIS should examine a broad range of issues and mitigation alternatives in order to formulate a more comprehensive and sustainable approach to flood management in the Sutter/Butte region, as described below.

Growth Inducing Impacts

The report should consider whether providing 200-year flood protection from Thermalito Afterbay to Yuba City north would increase, rather than decrease, flood risk by incentivizing development in these flood-prone areas. Flood risk, as defined by the state of California, equals the probability of flooding multiplied by the consequences of a flood. Although the project will reduce the *probability* of local flooding, the *consequences* of eventual flooding in a heavily developed community would be much more severe. Facilitating development efforts by cities, counties, and property owners in flood-prone regions may substantially increase flood risk over the long term.

Downstream Flood Impacts

In its emphasis on structural levee improvements, the proposed project could route more floodwater downstream to urban communities. By reducing the probability of levee failure in the Yuba City area during a large flood event, the project would necessarily increase the probability that flows would be routed downstream, and this would increase the risk of catastrophic flooding in Sacramento and West Sacramento. The report should consider and select alternative improvement measures that would avoid or mitigate these impacts.

Impacts Under Climate Change

The project should consider whether the proposed levee improvements will actually provide 100-year and 200-year protection under projected future flows assuming climate change.

Evaluate a Broader Range of Alternatives

In order to better advance the state and federal flood management goals, the EIR/EIS must evaluate a broader range of alternatives including:

- 1. **Levee Setbacks**: Evaluate the potential benefits of levee setbacks, including reduced operations and maintenance costs, improvements to local flood protection in the face of climate change, and benefits for fisheries and wildlife habitat.
- 2. **Ring Levees and Building Modifications**: Examine the potential that ring levees offer for protecting the existing communities of Gridley, West Gridley, Biggs, and Yuba City as an alternative to the proposed project. Elevate buildings outside the ring levees to protect against flooding.
- 3. **Flood Bypass**: Evaluate the opportunity to reduce peak flows during extreme flood events by rerouting floodwaters into the Butte Basin through a new flood bypass. Such a bypass could divert water out of Thermalito Afterbay and the Feather River and into the Cherokee Canal.
- 4. **Oroville Reservoir**: Consider opportunities for reducing extreme flood events by reoperating the Oroville reservoir either to expand the flood reservation or improve real time operations during flood events.
- 5. **Oroville Wildlife Area Levee Modification**: Explore opportunities for reducing peak flood flows through planned modifications to levees adjacent to the Oroville Wildlife Area that would increase flooding of the OWA. Modifying levees along the OWA is required by Article A106 Riparian and Floodplain Improvement Program in the Settlement Agreement for the Relicensing of the Oroville Facilities, FERC Project 2100, executed by the Department of Water Resources and 52 other parties in March 2006.

The costs and benefits of all alternatives should be evaluated in light of the life cycle costs of maintaining and operating the project.

By examining the aforementioned potential project impacts and considering additional mitigation alternatives, the FRWLP can adopt a sustainable flood management vision and offer long-term public safety as well as ecological benefits to the communities of the Sutter/Butte region.

We hope that, in compiling the EIR/EIS and in moving forward with the project, the Sutter Butte Flood Control Agency and its collaborators will consider our comments and be part of the movement towards a safer, more sustainable future for California's Central Valley.

Respectfully,

John Cain,

Director of Conservation California Flood Management Megan Randall,

Mega Randall

California Flood Management Fellow

From: Francis Coats [mailto:fecoats@msn.com]

Sent: Tuesday, June 28, 2011 12:34 PM
To: Norgaard, Ingrid; Matthew G. Davis
Subject: FW: Additional deaths in 1955 flood

Information on farmworkers who died on Shanghai Bend levee Christmas eve, 1955.

Date: Mon, 10 Jan 2011 15:44:32 -0800

From: mnewkom@yahoo.com

Subject: RE: Additional deaths in 1955 flood

To: fecoats@msn.com

Frank, I'm sure that Oji could possibily have that info in their "archives" if they still have them. I know I still have my old ranch books and employment records from 1956 on. The early stuff is gone.

--- On Mon, 1/10/11, Francis Coats < fecoats@msn.com > wrote:

From: Francis Coats < fecoats@msn.com Subject: RE: Additional deaths in 1955 flood

To: "Roberta Fletcher" <rlf@syix.com>, "Nelson Anthoine" <nelsonanthoine@sbcglobal.net>, "Joe and

Jackie Griffin" < "Jeet Bajwa" < jeetbaj@hotmail.com, "Janet Baur"

<edbaur@sbcglobal.net>, "Kurt Bonham" <bonhamcpa@citlink.net>, "Dick Boundy"

<<u>d.boundy@comcast.net</u>>, "Karna Boyer" <<u>boyerkar@syix.com</u>>, "Stan Cleveland"

<frypanman@excite.com>, "Suzanne Connelly" <misuzinca1@juno.com>, "Dan Cucchi"

<dancucchi@yahoo.com>, "Bob Harlan" <bob@kubaradio.com>, "Mike Darnell"

<mikeagle@yahoo.com>, "Narinder Dhaliwal" <ndhaliwal@sbcglobal.net>, "Angel Diaz"

<brooklyngeek@yahoo.com>, "David and Pamela Geitner" <geitner@comcast.net>, "Jack and Maxine

Elliott" < maxineelliott1695@yahoo.com >, "Diane Fales" < dfales@live.com >, "Darin Gale"

<a href="mailto:, "James Gallagher" < imgallagher21@hotmail.com, "Barbara Gaudreau"

<<u>b.bilingual@syix.com</u>>, "Richard von Geldern" <<u>vongeldern_ric@sbcglobal.net</u>>, "Ashley Gebb"

<agebb@appealdemocrat.com>, "Roy and Miriam Hatamiya" <<u>hatamiyas@yahoo.com</u>>, "Ray Janssen"

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<cinnamongirls@sbcglobal.net>, "Rob Klotz" <rob.klotz@yahoo.com>, "Robert LaHue"

<<u>rlahue@appealdemocrat.com</u>>, "Howard Yune" <<u>hyune@appealdemocrat.com</u>>, "Barbara LeVake"

<blevake@syix.com>, "Jack Levine" <jlevine@c21selectgroup.com>, "Rick and Jerrie Libby"

<rlibby@syix.com>, "Tej Maan" <tejmaan@hotmail.com>, "Bob Mackensen"

<rmackensen@sbcglobal.net>, "Russell and Mary Mayfield" <marymay2@sbcglobal.net>, "Dee and Roy

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Meli" <<u>dmeli1@comcast.net</u>>, "Eric Meyers" <<u>ericbmeyers@cs.com</u>>, "Elaine Miles"
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<usafarm@jps.net>, "Paul Singh" <butter2000p@aol.com>, "Chuck Smith"
<<u>chucksmith57@hotmail.com</u>>, "Leo and Marilyn Speth" <<u>lfspeth@sbcgloba</u>l.net>, "Robert and Pam
Stark" <stark@otnusa.com>, "Sarb Takhar" <sarb@sarb.com>, "Larry and Carla Virga" <emu@syix.com>,
"Gregor Blackburn" <gregor.blackburn@dhs.gov>, "Bill Edgar" <br/>bille@eanda.org>, "Kim Floyd"
<khoover@sutterbutteflood.org>, "Carlos Lazo" <carlos.j.lazo@usace.army.mil>, "Sean Minard"
<sminard@mhm-inc.com>, "Al Montna" <almontna@montnafarms.com>, "Duane Oliveira"
<a href="mailto:duane@theoliveiralawfirm.com">duane@theoliveiralawfirm.com</a>, "Dan Peterson" <a href="mailto:dwpeterson@co.sutter.ca.us">dwpeterson@co.sutter.ca.us</a>, "Michael Picker"
<picker@lincolncrow.com>, "Scott Rice" <srice@water.ca.gov>, "Jeff Twitchell"
<jtwitchell@geiconsultants.com>, "Steve Yuhas" <stephen.m.yuhas@usace.army.mil>, "Tyler Stalker"
<tyler.m.stalker@usace.army.mil>, "Ron Southard" <ronald_southard@sbcglobal.net>, "Sally Serger"
<sallyserger@yahoo.com>
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Date: Monday, January 10, 2011, 3:26 PM

It seems likely that Oji Brothers might have their names, at least the ones from the Shanghai Bend crew.

Date: Fri, 7 Jan 2011 16:32:51 -0800

From: rlf@syix.com

To: nelsonanthoine@sbcglobal.net; leeann@syix.com; jeetbaj@hotmail.com; edbaur@sbcglobal.net; bonhamcpa@citlink.net; d.boundy@comcast.net; boyerkar@syix.com; frypanman@excite.com; fecoats@msn.com; misuzinca1@juno.com; dancucchi@yahoo.com; bob@kubaradio.com; mikeagle@yahoo.com; ndhaliwal@sbcglobal.net; brooklyngeek@yahoo.com; geitner@comcast.net; maxineelliott1695@yahoo.com; dfales@live.com; daringale@hotmail.com; imgallagher21@hotmail.com; b.bilingual@syix.com; vongeldern ric@sbcglobal.net; agebb@appealdemocrat.com; hatamiyas@yahoo.com; rayjanssen@comcast.net; meccacol@comcast.net; cinnamongirls@sbcglobal.net; rob.klotz@yahoo.com; rlahue@appealdemocrat.com; hyune@appealdemocrat.com; blevake@syix.com; jlevine@c21selectgroup.com; rlibby@syix.com; tejmaan@hotmail.com; rmackensen@sbcglobal.net; marymay2@sbcglobal.net; dmeli1@comcast.net; ericbmeyers@cs.com; elaine.miles@att.net; chucknpat@comcast.net; rrnels1@aol.com; mnewkom@yahoo.com; hparassr@hotmail.com; kpatcal@yahoo.com; ron859@succeed.net; joanwood@earthlink.net; slruscigno@gmail.com; coldagua01@yahoo.com; usafarm@jps.net; butter2000p@aol.com; chucksmith57@hotmail.com; Ifspeth@sbcglobal.net; stark@otnusa.com; sarb@sarb.com; emu@syix.com; gregor.blackburn@dhs.gov; BillE@eanda.org; kim@floydcommunications.com; Ld1@syix.com;

khoover@sutterbutteflood.org; carlos.j.lazo@usace.army.mil; sminard@mhm-inc.com; almontna@montnafarms.com; duane@theoliveiralawfirm.com; dwpeterson@co.sutter.ca.us; Picker@lincolncrow.com; srice@water.ca.gov; jtwitchell@geiconsultants.com; stephen.m.yuhas@usace.army.mil; Tyler.M.Stalker@usace.army.mil; ronald_southard@sbcglobal.net; sallyserger@yahoo.com

Subject: Additional deaths in 1955 flood

Additional unreported deaths in the Yuba City 1955 flood by Roberta Fletcher

News reports state that thirty-eight people died in the Yuba City 1955 flood. What has not been reported is that many more lives were lost when the levee broke at Shanghai Bend on the Feather River. Burwell Ullrey, Sutter County Coroner at the time, documented thirty-eight flood-related deaths in Sutter County. The deaths of the men who were working on top of the levee at Shanghai Bend where it broke are not documented and are not included in the official count. This is Sutter County history that has never been made public.

In 1955 there were Mexican farm workers at Shanghai Bend and they died when the levee broke. It may seem hard for some people to believe that the deaths were not publicly reported and documented. But the 1950's were before the Civil Rights Movement and apparently no one in authority made the effort to document the deaths. It was easier at the time to just bury them and move on. We accepted the decisions that those in authority made. I believe there was no "conspiracy". It was just that people didn't talk about it.

My sources of information include:

Robert Fletcher (my husband) was volunteering on the levee at Shanghai Bend that night along with my father, Irving Pearce. My father worked a little farther down the levee with the English speaking people. Bob worked with the Mexicans because he knew a little Spanish. He said that Oji farms brought two bus-loads of "green card" Mexicans to work on the levee. He and my father left just before the levee broke. My husband always wondered what happened to the Mexicans.

Gabrial Singh's father and uncles were working that night down the levee from the Mexicans. When the levee broke they could hear the screams of the Mexican workers as they were being washed away.

Elaine Miles's father, after the flood, was working under the 5th Street Bridge. There were several bodies and by the way they were dressed he assumed they were Mexicans. They covered them with concrete.

Ben Mueck was a mechanic for Oji farms at the time and he verified the story of the farm workers.

A booklet on the 1955 flood that was written a year later by a person from the LDS church mentions buses and asks the question about who may have died.

Gerald Arnoldy said that the body of a Mexican worker was in a friend's swimming pool.

Jim Kimerer said his grandmother saw dead Mexicans in trees on Carlson Road. They apparently were washed down Gilsizer Slough. I asked him what happened to their bodies and he doesn't know.

I would like for those workers to be remembered for sacrificing their lives trying to keep the Feather River inside the levee. They will probably never be individually identified, but I want people to know the history.

Roberta Fletcher

From: Francis Coats [mailto:fecoats@msn.com]

Sent: Tuesday, July 05, 2011 9:25 AM **To:** Norgaard, Ingrid; Matthew G. Davis

Subject: West (right descending bank) Feather River Levee and Sacramento side, Sutter County Levee

project.

Please include me in all notices and disributions under CEQA and NEPA

Francis E. Coats, 3392 Caminito Avenue, Yuba City, CA 95991 (530) 701-6116, fecoats@msn.com

Please figure out and let us know the legal basis for the construction or improvement of levees, on each segment of levee, and include this in the documents.

Please figure out and let us know the extent to which the levee districts are obligated to provide for cross-levee access for private owners and the public; and, the extent to which the levee districts have a right to exclude underlying owners, owners of land on the wet side of the levee, and the public, from being on or crossing the levees.

So far as I know, the levee districts bought right-of-way for levees in the 1880 - 1900 era; and then, a another Valley wide entity bought right-of-way in the 1930's and 1940's.

Particularly the first generation of acquisitions may not be where the levee sits today. Some of these are mere easements, allowing the construction and maintenance of the levee, but not granting the right to exclude other users. Also, though some of the first generation of deeds may appear to grant the whole ownership of the land, the courts may believe that these are still merely easements.

Most of the second generation documents are clearly on their faces merely easements, not authorizing the grantee to exclude anyone else. It seems likely that the larger entity does have real property records that would be of help in figuring out what the rights are relative to the land and the levee.

My experience with Levee District One is that they say they do not have real property records reflecting the acquisition and ownership of levees, although they assume they own the levee and have a right to exclude the public from travelling across or along the levee.

However, they say they have no records, so they really don't have any idea. I identified, say 30 deeds into LD1 between 1870 and 1906, and these seem to correspond to the published county tax maps, particularly Pennngton (1873??) and Punnett (1895). The records are there and accessible, but some one needs to work them up and do the necessary legal research to see what the effects of those documents are.

The county does not tax land under the levee, on the theory that it is close to worthless, so tax records are not much help in figuring out who owns the land the levee sits on.

As part of the planning process, please address the question of who owns the segments of land the levee sit on, on what basis the levee district claims the right to maintain a levee on each segment, to what extent the levee district may have the right to exclude land-owners and members of the public, to what extent it is the burden of the levee district to build and maintain ramps to allow private owners or the public to cross the levee.

I imagine this come out to a series of reference map identifying the location of each tract and cross eferenced to the instrument creating it, with an evaluation of the effect of the document - what rights granted, what rights retained.

Also, a discussion of the legal effect of the documents and general law on whether levee deeds are read

as fee grants or mere easements; who is obligated to maintain ramps providing access across the levee; under what circumstances might the levee district be obligated to construct or maintain a ramp; when may the levee district exclude the underlying owner, owners inside the levee, or the public from crossing the levee.

Also, within human memory, the tops of the levees were open for use apparently as public roads. What happened to rights which might have existed by dedication, grant, or county road action?

Francis E. Coats, 3392 Caminito Avenue, Yuba City, CA 95991 (530) 701-6116, fecoats@msn.com

This would involve both work in the county real property records, and any records held by the levee districts and or the other greater entity that took title to lots of levee land in the 1930s and 1940s. the creation of a map showing the segments of levee right of way acquired and relating them to recorded documents. Evaluation of the documents for legal effect. Legal research to come up with an opinion of the legal effect of the documents.



July 26, 2011

(916) 358-2900 http://www.dfg.ca.gov

Ingrid Norgaard, Project Manager Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

Matt Davis, Environmental Resources Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, CA 95814

Dear Ms. Norgaard and Mr. Davis:

The Department of Fish and Game (DFG) has reviewed the Notices of Preparation (NOPs) and associated materials for the Sutter Basin and Feather River West Levee Projects (Projects) to be prepared pursuant to the California Environmental Quality Act (CEQA). Environmental Impact Statement/Environmental Impact Reports (EIS/EIRs) will be prepared for the Projects by the Sutter Butte Flood Control Agency (SBFCA) and the U.S. Army Corps of Engineers (USACE) to evaluate structural and non-structural flood-risk-management measures and address levee deficiencies in the Feather River's west levee. Because the Projects are being studied in coordination due to similar study areas, purpose, potential improvements, effects, and parties involved, the DFG has prepared this letter to comment on both Projects. The DFG appreciates the opportunity to provide initial comments on the Projects, and thanks SBFCA and USACE for granting the DFG's request for additional time to comment pursuant to CEQA Guidelines Section 15103.

The study area for the Projects is located in Butte and Sutter Counties, and encompasses approximately 285 square miles roughly bounded by the Feather River to the East; Sutter Bypass, Sutter Buttes, Wadsworth Canal to the West; and Cherokee Canal and Thermalito Afterbay to the North (study area). The Projects' purposes include evaluating structural and non-structural flood-risk-management measures including re-operation of existing reservoirs; improvements to existing levees; construction of new levees; and other storage, conveyance, and non-structural options. Flood waters potentially threatening the study area originate from the Feather River watershed and/or the upper Sacramento River watershed above Colusa Weir. The study area is essentially encircled by project levees and the high ground of Sutter Buttes. Geotechnical analysis and historical performance during past floods indicate that levees are at risk of failure due to underseepage and through-levee seepage.

Activities from the Projects may have significant impacts to fisheries, wildlife, habitats (both in natural and restoration areas), and to DFG lands which provide hunting, fishing, and other public use opportunities. The DFG is able to provide the recommendations included below based on the information provided in the NOPs and associated materials, and an understanding of the natural resources in the study area. The DFG would like to emphasize the critical importance of coordination with the DFG during the CEQA and regulatory processes and asks that SBFCA and USACE evaluate the DFG's comments closely to ensure that impacts are avoided, minimized and mitigated pursuant to CEQA and the appropriate regulations and statutes.

DFG's Authority

These initial comments are submitted under the DFG's authority as Trustee Agency with regard to the fish and wildlife of the State of California, designated rare or endangered native plants, game refuges, ecological reserves, and other areas administered by the DFG (CEQA Guidelines § 15386, subd. (a)). In addition, the DFG will likely be a Responsible Agency with regards to the Projects due to its discretionary approval power pursuant to the California Endangered Species Act (CESA) and/or Section 1603 of the Fish and Game Code (CEQA Guidelines § 15381). The DFG is also commenting as a landowner and conservation easement holder within the study area for the Projects.

CESA Species

The DFG has regulatory authority pursuant to CESA over projects that will result in the take of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species. Based upon a preliminary review, the DFG has identified several such species with potential to occur within the study area that may be affected by the Projects. These species include giant garter snake (Thamnophis gigas), bank swallow (Riparia riparia), Swainson's hawk (Buteo swainsoni), and other species listed in the attachment to this letter. Take of species protected pursuant to CESA is prohibited (Fish and Game Code § 2080). The DFG. however, may authorize the take of these species by permit if the conditions set forth in Fish and Game Code Section 2081, subdivisions (b) and (c) are met. (See also Cal. Code Regs., tit. 14, § 783.4). If the Projects could result in the take of any species protected pursuant to CESA, an incidental take permit issued by the DFG should be obtained before the take can occur. If the DFG will issue an incidental take permit, the DFG must rely on the EIS/EIRs as prepared by SBFCA and USACE to prepare and issue its own findings regarding the Projects (CEQA Guidelines §§15096 and 15381). The DFG will use the EIS/EIRs if they adequately address the effects of those project activities which the DFG is required by law to carry out or approve.

If a CESA incidental take permit will be sought from the DFG for the Project(s), the DFG will require the EIS/EIRs to contain a detailed analysis of the take and other potential

¹Pursuant to Fish and Game Code section 86, "'Take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill."

impacts to the species and its habitat, acreage of habitat affected or potentially affected, avoidance and minimization measures that will be implemented, and a detailed description of the mitigation measures that will be performed to reduce impacts to a level of less than significant and fully mitigate the impacts pursuant to CESA.

The DFG may only issue an incidental take permit if it is determined that impacts associated with the authorized take of the species are minimized, fully mitigated, and that adequate funding has been ensured to implement the mitigation measures (Fish and Game Code § 2081(b)(2) and (4)). Because take must be fully mitigated pursuant to CESA, a standard that is higher than the less than significance standard of CEQA. and because funding must be ensured to DFG standards for the minimization and full mitigation measures, the DFG suggests that if take will occur, SBFCA begin to examine and discuss potential strategies to fully mitigate and ensure adequate funding with the DFG now. The EIS/EIRs should include a discussion of the measures that will be required to minimize, fully mitigate and ensure adequate funding pursuant to CESA. The DFG must also determine that issuance of an incidental take permit will not jeopardize the continued existence of a CESA-listed species. The DFG will make this determination based on the best scientific information available and shall include consideration of the species capability to survive and reproduce, including the species known population trends and known threats to the species. The DFG requests that the EIS/EIRs include scientific information sufficient to justify such a determination if necessary.

Regardless of whether take of CESA-listed species is anticipated to occur or not, the EIS/EIRs should provide a comprehensive discussion of all CESA-listed species with a potential to be impacted by the Projects, their habitat, and a discussion of all speciesspecific mitigation measures that will reduce impacts to CESA-listed species and their habitat to below the level of significance. Any activity resulting in loss of habitat, decreased reproductive success, or other negative effects on population levels of species protected pursuant to CESA should be addressed. The DFG requests that sufficient technical data, thresholds of significance, best management practices, and similar information be included in the EIS/EIRs to permit a full assessment of all significant environmental impacts (CEQA Guidelines § 15147). Because the study area for the Projects is large, the DFG requests that the EIS/EIRs carefully examine the cumulative and landscape-level effects to CESA-listed species that may occur as a result of changes over such a broad landscape. General and specific plans, regional or local land management plans, as well as other closely related past, present, and reasonably foreseeable probable future projects, should be analyzed relative to their impacts on plant and animal communities, wildlife habitats and corridor use in the Sacramento Valley (CEQA Guidelines § 15130). The DFG also requests a careful examination of how the Projects may affect CESA-listed species dispersal in connection with the natural and artificial barriers in the study area. This analysis should include a discussion of adjacent habitats outside of the study area that support or could support species protected pursuant to CESA that may be impacted as a result of the Projects.

Giant Garter Snake

Giant garter snake is designated as threatened pursuant to CESA and occurs throughout the study area. Giant garter snake utilizes habitats associated with waterways and levees that may be directly altered by the Projects. The EIS/EIRs should include a detailed and careful discussion of the potential effects of the Projects on giant garter snake, particularly from any kind of vegetation removal, ground disturbing activities, temporary and permanent loss of habitat, changes in baseline conditions, and other forms of disturbance. The EIS/EIRs should include mitigation measures that will reduce these potential impacts to giant garter snake to below a level of significance. In addition, if take of giant garter snake is expected to occur as a result of the Projects, the EIS/EIRs should include an analysis of appropriate full mitigation measures, including, if necessary, measures to permanently protect and perpetually manage compensatory habitat. The DFG suggests that SBFCA and USACE begin examining locations that would be appropriate for giant garter snake mitigation.

Bank Swallow

Bank swallow is designated as threatened pursuant to CESA and occurs in the study area. Bank swallow utilizes naturally eroded river banks for nesting. Any loss of bank swallow nesting habitat could be considered a potentially significant impact pursuant to CEQA. The EIS/EIRs should identify all areas of existing and potential bank swallow nesting habitat that has the potential to be affected by the Projects. The EIS/EIRs should identify the Projects' potential impacts to bank swallow, and include mitigation measures that reduce these impacts to below a level of significance.

Swainson's Hawk

Swainson's hawk is designated as threatened pursuant to CESA and occurs throughout the study area. Swainson's hawk often utilizes trees in riparian areas for nesting and open landscapes for foraging. The DFG is concerned with potential impacts to raptor nesting behavior as a result of the Projects' activities, and potential loss of foraging and nesting habitat. The Projects' activities could potentially result in significant impacts to nesting raptors including nest abandonment, starvation of young, and/or reduced health and vigor of eggs or nestlings that could result in death. The EIS/EIRs should identify the Projects' potential impacts to Swainson's hawk, and include mitigation measures that reduce these impacts to below a level of significance, and fully mitigate them if necessary.

Chinook Salmon

The Feather River is located adjacent to the eastern border of the study area. The Feather River supports several fish species that utilize the river for immigration, emigration, spawning and/or rearing. These fish species include runs of Chinook salmon (*Oncorhynchus tshawytscha*). Winter-run Chinook salmon is designated as endangered and Spring-run Chinook salmon is designated as threatened pursuant to

CESA. The EIS/EIRs should analyze any potential impacts to these species that may occur as a result of the Projects, and include mitigation measures that reduce these impacts to below a level of significance.

Threatened and Endangered Plants

The EIS/EIRs should include a full impact assessment for plants that are designated as threatened or endangered pursuant to CESA and have the potential to occur in the study area. Numerous vernal pool endemic plant species that are protected pursuant to CESA are known to occur in the study area. The EIS/EIRs should evaluate, but not limit its evaluation, to impacts to the plant species included in the attachment to this letter. The EIS/EIRs should analyze any potential impacts to CESA-listed species that may occur as a result of the Projects, and include mitigation measures that reduce these impacts to below a level of significance.

Other Species Considerations

The regional setting and baseline habitat conditions are critical to an assessment of environmental impacts of the Projects. Therefore the EIS/EIRs should place special emphasis on describing and identifying the locations of existing resources within the study area that are rare or unique (CEQA Guidelines, § 15125 (a)).

The DFG recommends that appropriate surveys be conducted for CESA-listed and other species using standard protocols at the time of year when the species are both evident and identifiable. Field surveys should be scheduled to coincide with the appropriate breeding or other life history stages of animals, when they are likely to be evident. Full floristic surveys should be conducted for any parts of the study area where ground disturbance will occur or where significant changes such as new inundation will occur. Surveys should be scheduled to coincide with peak flowering periods and/or during periods of phonological development that are necessary to identify the plant species. A list of all plant and animal species encountered should be included with the EIS/EIRs.

In addition to species that are protected pursuant to CESA, the EIS/EIRs should evaluate in a similar manner impacts to species that are protected pursuant to other State or federal statutes or regulations, or that may otherwise be considered rare, endangered, or sensitive. This includes an evaluation of impacts to species protected pursuant to the federal endangered species act (16 U.S.C. § 1531)(ESA), plants that are listed with a California Rare Plant Rank, animals listed as a DFG species of special concern, birds of prey (Fish and Game Code § 3503.5), eagles (16 U.S.C. 668-668c), migratory birds (16 U.S.C. 703-712), species listed in the Fish and Game Code as fully protected (Fish and Game Code §§ 3511, 4700, 5050, and 5515), bird nests and eggs including heron rookeries (Fish and Game Code § 3503), and any species that meets the standard in Section 15380 of the CEQA Guidelines. The DFG suggests that the EIS/EIRs include separate thresholds of significance for each of the different species designations listed above that may be impacted by the Projects. The EIS/EIRs should also consider potentially significant cumulative impacts to other species in a manner similar to that described for CESA-listed species above.

Lake or Streambed Alteration Agreement

Pursuant to Section 1602(a) of the Fish and Game Code an entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake unless the DFG receives written notification beforehand. If the activity may substantially adversely affect an existing fish or wildlife resource then an agreement with the DFG will be required which includes reasonable measures necessary to protect the resource. In general, potentially significant impacts to the environment that should be addressed pursuant to CEQA result whenever a project involves work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel, including ephemeral streams and water courses. Due to the nature of the Projects, the DFG anticipates that a Lake and Streambed Alteration Agreement (LSAA) will be required for the Projects. If DFG will issue an LSAA, the DFG must rely on the EIS/EIRs as prepared by SBFCA and USACE to prepare and issue its own findings regarding the Projects (CEQA Guidelines §15096 and 15381). The DFG will use the EIS/EIRs if they adequately address the effects of those project activities which the DFG is required by law to carry out or approve.

If a LSAA will be sought from the DFG pursuant to Section 1600 et seq. of the Fish and Game Code, the DFG requests that the EIS/EIRs contain specific and detailed descriptions of all fish² and wildlife³ resources that may be substantially adversely affected by any alteration in the bed, channel, bank, natural flow, and the measures necessary to protect them. The EIS/EIRs should delineate and identify seasonally and permanently wetted channels, sloughs, depressions, ponds, etc. that will be filled and/or modified as a result of the Projects. These areas should be quantified by existing habitat type, management strategies and constraints, species presence, and ownership and/or agency responsible for the management and maintenance of the parcel. The DFG requests that the description and protection measures in the EIS/EIRs be supported by scientific information.

The Feather River EIP Preliminary Identification/Design Report (Kleinfelder 2009) states on page 85 Section 5.18.7 in the third mitigation proposal that the backfilling of a pond could be a solution to reducing levee permeability. If this is considered to be an option, the EIS/EIRs should identify the ponds proposed for filling and the measures that will be required to reduce such an impact to below a level of significance.

Other Habitat Considerations

In addition to potential impacts to the bed, channel, or bank of rivers, streams, or lakes, the Projects could also result in potentially significant impacts to associated riparian habitat and wetlands. The DFG recommends that the Projects be designed to avoid

²Pursuant to Fish and Game Code section 45, "'Fish' means wild fish, mollusks, crustaceans, invertebrates, or amphibians, including in part, spawn, or ova thereof."

³Pursuant to Fish and Game Code section 711.2(a), "'Wildlife' means and includes all wild animals, birds, plants, fish, amphibians, reptiles, and related ecological communities, including the habitat upon which the wildlife depends for its continued viability."

impacts to wetlands and riparian habitat as much as possible. Mitigation should be provided for unavoidable impacts to wetland and riparian habitat based upon the concept of no net loss of habitat values or acreage.

The EIS/EIRs should identify where any fill material (borrow) will come from, including who owns the property and/or mineral rights for the extraction, who will have management responsibility for borrow areas, and the management purpose of borrow area properties. The EIS/EIRs should quantify the number of old growth riparian trees that may be removed and or impacted by the Projects, and include appropriate mitigation.

The Projects may also contribute to habitat fragmentation and isolation of plant and animal populations. The EIS/EIRs should identify areas where habitat fragmentation or isolation of populations may occur as a result of the Projects, and discuss alternatives or potentially feasible mitigation measures that will avoid or substantially lessen these potential impacts to less than significant levels. Existing wildlife corridors and movement areas should be maintained, and access to undisturbed habitat in adjacent areas, should be provided or maintained. The EIS/EIRs should also analyze project impacts relative to their effects on off-site habitats, and populations. This should include nearby public lands, open space, adjacent natural habitats and riparian ecosystems.

Due to the collective changes to riparian and aquatic ecosystems brought about by agriculture, urbanization, flood risk management and water supply infrastructure, every opportunity to restore and protect existing natural resources should be taken whenever changes in these systems are being contemplated. Potential ecosystem restoration measures include restoration of floodplain function and habitat, and conserving lands with habitat connected to other protected lands. When considering how to mitigate for any potential impacts that could result from the Projects, the DFG encourages SBFCA and USACE to consider broader conservation efforts and goals in the area.

The EIS/EIRs should contain an evaluation of the Projects' consistency with applicable land use plans, such as General Plans, Specific Plans, Watershed Master Plans, and Habitat Conservation Plans, that are established or under development in the study area. The EIS/EIRs should also contain current information regarding any previous reports of sensitive species and habitats including Significant Natural Areas (Section 1930 et seq. of the Fish and Game Code), Significant Ecological Areas, or Environmentally Sensitive Habitat Areas that have been identified near or adjacent to the study area.

DFG Lands, Restoration Efforts and Public Use

The DFG strives to maintain and enhance hunting, fishing and other appropriate public use opportunities throughout the study area. The DFG owns and manages several wildlife and fishing access areas within the study area including the Feather River Wildlife Area (Nelson Slough, Lake of the Woods, O'Connor Lakes, Abbott Lake, and Shanghai Bend), Oroville Wildlife Area, Sutter Bypass, and Gray Lodge Wildlife Area.

These areas provide recreation opportunities (hunting, fishing, wildlife observation, etc.) and access points for the public. Some of these lands are areas that have been restored (especially along the Feather River), and are areas where creation and preservation of habitat is especially important.

The DFG considers impacts to lands owned or managed by the DFG and to public use opportunities to be potentially significant biological and recreational impacts. The DFG requests that the EIS/EIRs fully address potentially significant impacts to DFG lands and public use and recreation, and include appropriate measures to reduce such impacts to less than significant.

The routes and impact areas of the Projects should be clearly defined in the EIS/EIRs to fully evaluate potentially significant impacts. In Figure 2: "Feather River West Levee Project Study Area", the "Levees Proposed for Improvement" alignment shows the levee route approaching the Feather River and cutting through the southern portion of the Oroville Wildlife Area. The DFG is concerned with possible significant impacts to the Oroville Wildlife Area. The current flood control levee passes to the west of the Oroville Wildlife Area boundary. Any proposed new alignment of the levee system through a Wildlife Area should be discussed with the DFG extensively.

The EIS/EIRs should also identify and quantify the cumulative and other impacts of the Projects on existing restoration efforts, and habitats within inundation zones and floodplains that could potentially be impacted by the Projects.

SBFCA and USACE should work with the DFG to ensure that the Projects are consistent with the current efforts to restore floodplain connectivity and habitat corridors, and do not conflict with or inhibit existing restoration projects (e.g. at O'Connor Lakes, Gray Lodge), Management Plans or the goals of the overall Lower Feather River Corridor Management Strategy.

In addition, the Projects should be planned to avoid effects to existing DFG private lands conservation programs such as The California Waterfowl Habitat Program. This program is one of the few incentive based programs that provide private landowners with technical assistance and financial incentives to manage wetland habitat in a specific way for 10 years, and an easement program where landowners are required to follow a cooperatively developed wetland management plan.

SBFCA and USACE should identify lands subject to conservation easements in the study area and ensure that the Projects are implemented consistent with the conservation easement terms.

Other Considerations

The EIS/EIRs should identify clear windows of construction and other measures that will minimize impacts to wildlife as well as the recreating public.

In order to comply with Public Resources Code Section 21081.6, detailed monitoring programs should be developed for all mitigation measures required in the EIS/EIRs

relevant to DFG's jurisdiction. The monitoring programs should include specific criteria to measure effectiveness of mitigation measures, clear timelines for implementation, identification of responsible parties, annual monitoring of restored areas or mitigation lands if applicable, performance criteria for the mitigation measures, and annual monitoring reports submitted to the lead agency and the DFG which include corrective recommendations that shall be implemented in order to ensure that mitigation efforts are successful.

The EIS/EIRs will also be subject to CEQA filing fees pursuant to Fish and Game Code Section 711.4, which must be paid at the time the Notices of Determination for the final EIS/EIRs are filed.

If you have any questions regarding this letter please contact Jeb Bjerke, Environmental Scientist, at jbjerke@dfg.ca.gov or (916) 358-2956.

Sincerely

Kent A. Smith Regional Manager

Attachment

ec: Laura Whitney

United States Army Corps of Engineers

Tina Bartlett
Jeff Drongensen
Jennifer Navicky
Jeb Bjerke

Department of Fish and Game

Attachment

The DFG requests that the EIS/EIRs include, but not be limited to analyzing potentially significant impacts to the following species:

Scientific Name	Common Name		
Plants	- Common Hamo		
Astragalus tener var. ferrisiae	Ferris' milk-vetch		
Atriplex cordulata	heartscale		
Atriplex minuscula	lesser saltscale		
Atriplex subtilis	subtle orache		
Balsamorhiza macrolepis var.	big-scale balsamroot		
macrolepis	big bodie balodimost		
Brasenia schreberi	watershield		
California macrophylla	round-leaved filaree		
Castilleja rubicundula ssp. rubicundula	pink creamsacs		
Centromadia parryi ssp. parryi	pappose tarplant		
Chamaesyce hooveri	Hoover's spurge		
Clarkia biloba ssp. brandegeeae	Brandegee's clarkia		
Delphinium recurvatum	recurved larkspur		
Downingia pusilla	dwarf downingia		
Fritillaria pluriflora	adobe-lily		
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow		
Juncus leiospermus var. ahartii	Ahart's dwarf rush		
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush		
Layia septentrionalis	Colusa layia		
Legenere limosa	legenere		
Limnanthes floccosa ssp. californica	Butte County meadowfoam		
Monardella douglasii ssp. venosa	veiny monardella		
Navarretia leucocephala ssp. bakeri	Baker's navarretia		
Neostapfia colusana	Colusa grass		
Orcuttia pilosa	hairy Orcutt grass		
Orcuttia tenuis	slender Orcutt grass		
Paronychia ahartii	Ahart's paronychia		
Pseudobahia bahiifolia	Hartweg's golden sunburst		
Sagittaria sanfordii	Sanford's arrowhead		
Silene verecunda ssp. Verecunda	San Francisco campion		
Trichocoronis wrightii var. wrightii	Wright's trichocoronis		
Trifolium jokerstii	Butte County golden clover		
Tuctoria greenei	Greene's tuctoria		
Wolffia brasiliensis	Brazilian watermeal		
Animals			
Acipenser medirostris	green sturgeon		
Agelaius tricolor	tricolored blackbird		
Ambystoma californiense	California tiger salamander		
Antrozous pallidus	pallid bat		
Athene cunicularia	burrowing owl		
Branchinecta lynchi	vernal pool fairy shrimp		
Branta hutchinsii leucopareia	cackling goose		
Diana natoninsii loatopartia	odoming goods		

Buteo swainsoni	Swainson's hawk		
Charadrius montanus	mountain plover		
Circus cyaneus	northern harrier		
Coccyzus americanus occidentalis	western yellow-billed cuckoo		
Dendroica petechia brewsteri	yellow warbler		
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle		
Dipodomys californicus eximius	Marysville California kangaroo rat		
Elanus leucurus	white-tailed kite		
Emys marmorata	western pond turtle		
Eumops perotis californicus	western mastiff bat		
Grus canadensis tabida	greater sandhill crane		
Haliaeetus leucocephalus	bald eagle		
Lampetra ayresii	river lamprey		
Lanius ludovicianus	loggerhead shrike		
Lasiurus blossevillii	western red bat		
Laterallus jamaicensis coturniculus	California black rail		
Lepidurus packardi	vernal pool tadpole shrimp		
Mylopharodon conocephalus	hardhead		
Oncorhynchus mykiss irideus	steelhead		
Oncorhynchus tshawytscha	chinook salmon		
Riparia riparia	bank swallow		
Spea hammondii	western spadefoot		
Taxidea taxus	American badger		
Thamnophis gigas	giant garter snake		

----Original Message----

From: David Neubert [mailto:dcneubert@gmail.com]

Sent: Tuesday, July 05, 2011 4:35 PM

To: Davis, Matthew G SPK

Subject: Sutter Basin and Feather River West Levee Project - Scoping Meeting

Comments

Matthew,

The following are my comments on the 28 June Scoping Meeting that I attended in Gridley, CA, in regards to the Sutter Basin and Feather River West Levee Project.

First, let me say that I am encouraged that the Corps and its partners value the input of local citizens in the project area, and are considering ways to optimize both flood safety and riparian ecosystems under the two new projects.

Regarding the presentation given on the 28th, I (along with other citizens I talked with) found it to be rather vague and lacking enough detail for the audience to generate questions from. The opaque nature of the presentation did not help the people understand what the Corps is planning in the project areas, and what the various options are. In the future, it would be better if the Corps (or its consultants) actually presented ideas on the types of activities that are being planned. For example, the Corps could identify areas where levee setbacks may occur, identify areas where riparian habitat can be improved and conserved, identify areas where levees are weak or strong and specific actions that might take place at weak sites to remedy problems.

The format used at the Gridley meeting was probably not worth the time and money invested.

Following the presentation, I spoke with one of the consultants employed by the Corps (or one of its partners). I asked the consultant specifically where levee setbacks may occur on the Feather River West project. He said that there were four possible sites or sites under consideration. One of them (as I recall) was in Butte County near Almond Avenue. A second area identified was at the confluence of the Feather River and the Sutter Bypass (just south of Sacramento Avenue, Sutter County).

As a resident of south Sutter County, I would support any levee setback near the confluence of the Feather River and Sutter Bypass. By creating a wider floodplain in this area, I would think that peak flood levels could be reduced along the Nicolaus Reach. It is my understanding that this is one of the most flood-threatened reaches of the Feather River at the current time. I hope the Corps aggressively researches the development of a levee setback area near the confluence. This land is currently only in agriculture and the Corps could minimize land acquisition costs by simply utilizing a flood easement rather than land purchase if the levee is moved north to widen the flood plan.

I look forward to seeing hydraulic models and your other findings of levee setback options and costs as they are developed.

Regards, David Neubert

Classification: UNCLASSIFIED

Caveats: NONE

CALIFORNIA STATE LANDS COMMISSION 100 Howe Avenue, Suite 100-South Sacramento, CA 95825-8202



June 29, 2011

CURTIS L. FOSSUM, Executive Officer (916) 574-1800 FAX (916) 574-1810 California Relay Service From TDD Phone 1-800-735-2929 from Voice Phone 1-800-735-2922

> Contact Phone: (916) 574-1890 Contact FAX: (916) 574-1885

File Ref: SCH #2011052062

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street Sacramento, CA 95814

Subject: Notice of Preparation (NOP) for a Joint Environment Impact Report (EIR)/Environmental Impact Statement (EIS) for the Feather River West Levee Project, Sutter and Butte Counties

Dear Ms. Norgaard:

Staff of the California State Lands Commission (CSLC) have reviewed the subject NOP for a joint EIR/EIS for the Feather River West Levee Project (FRWLP or Project), which is being prepared by the U.S. Army Corps of Engineers (USACE) as the federal lead agency under the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] § 4321 et seq.) and the Sutter Butte Flood Control Agency (SBFCA) as the state lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] § 21000 et seq.).

The FRWLP is being sponsored by the SBFCA and Central Valley Flood Protection Board (CVFPB) as a locally driven flood risk reduction project. USACE has authority through the Rivers and Harbors Act of 1899 (as amended) over modifications to federal flood control project levees, and any such alterations proposed by SBFCA are subject to approval by USACE.

The FRWLP is being studied in close coordination with the Sutter Basin Feasibility Study (SBFS), a separate but related project, because the FRWLP and the SBFS at least partially overlap in their study areas, purpose, potential improvements, potential effects, and involved parties.

The CSLC has prepared these comments as a trustee and responsible agency because of its trust responsibility for projects that could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters.

CSLC Jurisdiction

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable rivers, sloughs, lakes, etc. The CSLC has certain residual and review authority for tide and submerged lands legislatively granted in trust to local jurisdictions (PRC § 6301, § 6306). All tide and submerged lands, granted or ungranted, as well as navigable rivers, sloughs, etc., are impressed with the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for fill or artificial accretion. On navigable non-tidal waterways, the State holds fee ownership of the bed landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark. Such boundaries may not be readily apparent from present day site inspections.

The location of the proposed Project may involve sovereign land in the Feather River under the jurisdiction of the Commission. However, information submitted in the NOP is insufficient for CSLC staff to determine the extent and location of the Project with respect to sovereign ownership interests of the State. We request that as the Project proceeds, the SBFCA submit additional information (e.g., detailed maps) to enable CLSC staff to determine if any components of the Project will require a lease or permit. We additionally request to be placed on any future distribution mailing list for the Project.

Proposed Project

The SBFCA proposes the FRWLP under the California Department of Water Resources (DWR) Early Implementation Program (EIP) to expeditiously complete flood risk reduction measures in advance of the Sutter Basin Project.

SPFCA is planning the FRWLP to address levee deficiencies in the west levee of the Feather River between Thermolito Afterbay and the Feather River/Sutter Bypass confluence to meet federal, state and local flood protection criteria and goals. Primary deficiencies of the levee include:

- through-seepage;
- under-seepage; and
- embankment instability (overly steepened slopes).

Alternatives considered for addressing levee deficiencies may include measures such as:

- slurry cut-off walls;
- seepage berms;
- · stability berms;
- internal drains:
- relief wells:
- sheet-pile walls;
- slope flattening; and
- potential new levee alignments.

Environmental Review

A thorough Project description should be included in the EIR/EIS in order to facilitate meaningful environmental review of potential impacts, mitigation measures, and alternatives. The Project description should be as precise as possible in describing the details of all proposed activities (e.g., types of equipment or methods that may be used, maximum area of impact, seasonal work windows, locations for material disposal, etc.), as well as the details of the timing and length of activities. A thorough description will facilitate CSLC staff's determination of the extent and location of its leasing jurisdiction, make for a more robust analysis of the work that may be performed, and minimize the potential need for subsequent environmental analysis.

Biological Resources

- 1. <u>Sensitive Species</u>: SBFCA should conduct queries of the California Department of Fish and Game's (DFG) California Natural Diversity Database (CNDDB) and U.S. Fish and Wildlife Service's (USFWS) Special Status Species Database to identify any special-status plant or wildlife species that may occur in the Project area. Additionally, SBFCA should consult early in the process with appropriate staff at DFG to identify species of concern. The EIR/EIS should analyze the potential for such species to occur in the Project area and, if impacts to special-status species are found to be significant, identify feasible mitigation measures.
- 2. <u>Invasive Species</u>: One of the major stressors to the Sacramento-San Joaquin River Delta is introduction of non-native species. As the Feather River is a principal tributary of the Sacramento River, the EIR/EIS should consider a plan with a range of alternatives for prevention programs for terrestrial and aquatic invasive species (including quarantine, early detection, and early response) to slow the introduction of invasive species into high-traffic and sensitive areas. In developing these alternatives, the proposed plan should consider using current and proposed aquatic invasive species prevention programs in the area as models. In addition, in light of the recent decline of pelagic organisms and in order to protect at-risk fish species, the EIR/EIS should examine if the objectives of the plan would favor non-native fisheries within the Sacramento and San Joaquin River system and Delta.

3. Construction Noise: The EIR/EIS should evaluate noise and vibration impacts on fish and birds from construction, restoration or flood control activities in the water, on the levees, and for land-side supporting structures. Mitigation measures could include species-specific work windows as defined by DFG, USFWS, and the National Oceanographic and Atmospheric Administration's Fisheries Service (NOAA Fisheries). Again, staff recommends early consultation with these agencies to minimize the impacts of the Project on sensitive species.

Climate Change

A greenhouse gas (GHG) emissions analysis consistent with the California Global Warming Solutions Act (AB 32) and required by section 15064.4 of the State CEQA Guidelines¹ should be included in the EIR/EIS. This analysis should identify a threshold for significance for GHG emissions, calculate the level of GHGs that will be emitted as a result of construction and ultimate build-out of the Project, determine the significance of the impacts of those emissions, and, if impacts are significant, identify mitigation measures that would reduce or minimize them. The analysis should pay particular attention to the possibility of cumulative impacts of GHG emissions.

Cultural Resources

- 1. <u>Submerged Resources</u>: The EIR/EIS should evaluate the possibility of submerged cultural resources in the Project area. The CSLC maintains a shipwrecks database, available at http://shipwrecks.slc.ca.gov, that can assist with this analysis. The database includes known and potential vessels located on the State's tide and submerged lands; however, the locations of many shipwrecks remain unknown. Please note that any submerged archaeological site or submerged historic resource that has remained in state waters for more than 50 years is presumed to be significant.
- 2. <u>Title to Abandoned Resources</u>: The EIR/EIS should mention that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. Mitigation measures should be developed to address any submerged cultural resources that may be affected by the proposed Project and any unanticipated discoveries during the Project's construction. CSLC staff would like to review the proposed mitigation measures and requests that SBFCA consult with CSLC staff, should any cultural resources be discovered during construction of the proposed Project.

Hydrology and Water Quality

SBFCA should disclose and analyze the Project's potential to adversely affect water quality. Such impacts are likely to include increased turbidity and sedimentation from

¹ The "State CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

construction disturbance, dredging, fill, and other in-water construction work, and potential pollution from worksite spills or mobilization of pollutants from the disturbed soils. For any effects found to be potentially significant, the EIR/EIS should identify feasible mitigation measures that would avoid or lessen such effects.

Recreation

As public access and recreation on State lands are key concerns of the Public Trust, CSLC staff requests that the EIR/EIS analyze the Project's short-term and long-term impacts on recreation resources, both during construction and for the life of the project. Any significant impacts will require mitigation measures that either minimize or reduce the impacts or otherwise compensate residents and visitors.

Mitigation and Monitoring

To avoid the improper deferral of mitigation, mitigation measures should either be presented as specific, feasible, enforceable obligations, or should be presented as formulas containing "performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way" (State CEQA Guidelines § 15126.4(b)).

It would also be helpful to provide a summary of the mitigation measures relied upon to avoid or reduce the identified impacts to less than significant, in addition to a monitoring program of these actions to ensure compliance and enforceability through permit conditions, agreements or other measures during Project implementation.

As a potential responsible agency, the CSLC may need to rely on this document for the issuance of a lease, therefore, we request that you consider our comments during preparation of the draft EIR/EIS.

If you have any questions concerning environmental review or where to send copies of future FRWLP-related notices and/or environmental documents, please contact Joan Walter, Environmental Scientist, at (916) 574-1310 or by e-mail at joan.walter@slc.ca.gov. If you have any questions concerning CSLC leasing jurisdiction, please feel free to contact Ninette Lee, Public Land Manager, at (916) 574-1869.

Sincerely

Cy R. Oggins, Chief

Division of Environmental Planning and Management

cc: Matt Davis, Environmental Resources Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, CA 95814

Office of Planning and Research N. Lee, LMD, CSLC J. Walter, DEPM, CSLC

From: Megan Randall [mailto:mrandall@americanrivers.org]

Sent: Wednesday, June 22, 2011 3:47 PM

To: Norgaard, Ingrid; Matthew.G.Davis@usace.army.mil **Subject:** Feather River West Levee Project Information

Dear Ingrid and Matt,

I am writing to you in hopes of discussing the Feather River West Levee Project. I was hoping that you might be able to help me answer a couple questions or provide me with some helpful materials before the scoping period ends. American Rivers is interested in submitting comments, and we would like to get all the information possible before doing so.

Specifically, I would like to get some more in-depth information on exactly what is being proposed for the Feather River Levee system. Do you have any additional information or reports on the following that might help me become better informed?

- a. Background information: Reports detailing the current flaws in the levee system. Technical background information identifying specific flaws and the need for improvements.
- b. Details about what is being proposed currently:
 - i. Detailed maps of which levees and regions are identified for repair, etc.
 - ii. Detailed reports on the proposed design for repair. I am aware that the design process isn't expected to be completed until 2012. Do you know how far along the design process is and if there are any reports which would give insight into the most significant elements of the plan to date?
- c. Lastly, are you aware of any information on the project's relationship to expanded urban development in the region? Do you know if there is any literature on proposed development projects, or if there is someone I can contact to get more information on this aspect of the project?

Thanks to both of you for your time and any help you can provide.

Best, Megan Randall From: Megan Randall [mailto:mrandall@americanrivers.org]

Sent: Monday, June 27, 2011 3:30 PM

To: Norgaard, Ingrid

Subject: RE: Feather River Levee Scoping Period

Dear Ingrid,

Thanks for your help and insights. I have a couple additional questions.

I am curious as to whether there are any existing maps which identify the location and boundaries of the Reaches outlined by the Preliminary Identification/Design Report. It would be nice to get a visual of the precise location of the proposed improvements.

Also, I am wondering if you (or anyone else) might be able to provide any information as to the relationship between the FRWLP and the Sutter Basin Feasibility Study. Do you know why these two projects were both included in the NOP?

Thanks so much! I really appreciate your time and help.

-Megan

From: Norgaard, Ingrid [mailto:INorgaard@icfi.com]

Sent: Monday, June 27, 2011 6:45 AM

To: <u>admin@sutterbutteflood.org</u>; Megan Randall **Subject:** RE: Feather River Levee Scoping Period

Megan, I can see why that title on Attachment 1 is confusing, but the intent of that doc is only to provide additional information related to scoping for the Draft EIS/EIRs under preparation (none have been prepared to date). And to clarify, we are accepting comments through July 8, 2011.

Thanks, Ingrid

From: SBFCA [mailto:admin@sutterbutteflood.org]

Sent: Friday, June 24, 2011 4:08 PM

To: Norgaard, Ingrid; mrandall@americanrivers.org **Subject:** FW: Feather River Levee Scoping Period

Hi, Megan;

I've copied Ingrid Norgaard on this email as she will be able to answer your environmental questions below.

Ingrid;

Please see the email below re: enviro questions. Could you please review and respond to Megan (copied on this email)?

Thank you! Sarah

Sutter Butte Flood Control Agency

530-755-9859 o

1227 Bridge Street, Suite C Yuba City, CA 95991

<u>admin@sutterbutteflood.org</u> www.SutterButteFlood.org

From: Megan Randall [mailto:mrandall@americanrivers.org]

Sent: Wednesday, June 22, 2011 3:37 PM

To: admin@sutterbutteflood.org

Subject: RE: Feather River Levee Scoping Period

Dear Sarah,

Thanks for the information. I have a couple additional questions that perhaps you can answer for me.

1. The PDF of the NOP which was provided on the website also includes a document labeled Attachment 1: DRAFT Environmental Impact Statements/Environmental Impact Reports. I found this a bit confusing since the document does not appear to be a comprehensive EIS/EIR and I wasn't aware that the draft EIR/EIS had been released yet. Could you clarify what Attachment 1 is meant to be?

Sorry for the long e-mail. Any help or insight would be very much appreciated!

Thanks for your time, Megan Randall

From: SBFCA [mailto:admin@sutterbutteflood.org]

Sent: Wednesday, June 22, 2011 2:30 PM

To: Megan Randall

Subject: RE: Feather River Levee Scoping Period

Hi, Megan;

Thanks for your inquiry – and, good timing! Our public scoping meetings are next week; you can find information on our website here: http://sutterbutteflood.org/index.php/news events/events/. I hope this information is helpful to you. Should you have any additional questions, please don't hesitate to email me.

Thanks! Sarah Modeste

Sutter Butte Flood Control Agency

1227 Bridge Street, Suite C Yuba City, CA 95991

<u>admin@sutterbutteflood.org</u> www.SutterButteFlood.org

From: Megan Randall [mailto:mrandall@americanrivers.org]

Sent: Tuesday, June 21, 2011 9:51 AM

To: info@sutterbutteflood.org

Subject: Feather River Levee Scoping Period

I wanted to inquire about the Feather River West Levee Rehabilitation Project. I was wondering if the scoping period for this project has closed, or if there is still time to comment.

Thanks for any insights.

Best, Megan Randall From: Megan Randall [mailto:mrandall@americanrivers.org]

Sent: Thursday, June 30, 2011 10:40 AM

To: admin@sutterbutteflood.org

Cc: Norgaard, Ingrid; Matthew.G.Davis@usace.army.mil

Subject: FRWLP Questin

Dear Sarah, Ingrid, and Matthew,

I have one additional question about the FRWLP that perhaps you might be able to help me with.

I have been browsing the Preliminary Problem Identification Report as well as the Preliminary Design Report on the SBFCA website, and I noticed that the levee project identified by these documents is only 27 miles long and runs from Yuba City north to Thermalito Afterbay.

On the website, however, the project maps and the NOP identify the FRWLP as running all the way from Thermalito Afterbay to the Sutter Bypass confluence, a total of 44 miles.

I am just curious as to why the information differs, and how the two projects are related (the levee project from Thermalito after to Yuba City, and then the project from Yuba City to the Sutter Bypass confluence). Will the SBFCA implement both of these projects? Does the approximate \$300 million cost estimate cover improvements for the entire stretch, or just the 27 mile stretch? Is there any other information about the proposed Yuba-Sutter Bypass improvements available that might clarify some of my questions?

Thanks so much for all your help!

Best, Megan

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364 SACRAMENTO, CA 95814 (916) 653-4082 (916) 657-5390 - Fax



July 15, 2011

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

RE: SCH# 2011052062 Sutter Basin Feasibility Study and Feather River West Levee Project; Sutter and Butte Counties.

Dear Ms. Norgaard:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
 - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
 - If any known cultural resources have already been recorded on or adjacent to the APE.
 - If the probability is low, moderate, or high that cultural resources are located in the APE.
 - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
 - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
 - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
 - A Sacred Lands File Check. USGS 7.5 minute quadrangle name, township, range and section required.
 - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures.
 Native American Contacts List attached.
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
 - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
 - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
 - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely.

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Native American Contact List

Sutter and Butte Counties July 15, 2011

Berry Creek Rancheria of Maidu Indians

Cultural Resources Rep

#5 Tyme Way Oroville

, CA 95966

gmix@berrycreekrancheria.com

(530) 534-3859

(530) 534-1151 FAX

Butte Tribal Council

Ren Reynolds

1693 Mt. Ida Road Maidu

Oroville

, CA 95966

(530) 589-1571

Mechoopda Indian Tribe of Chico Rancheria

Dennis E. Ramirez, Chairperson

125 Mission Ranch Blvd

Mechoopda Maidu

Tyme Maidu

Chico , CA 95926 Concow

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(530) 899-8517 - Fax

Mooretown Rancheria of Maidu Indians

Gary Archuleta, Chairperson

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Maidu KonKow / Concow

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Greenville Rancheria of Maidu Indians

Kyle Self, Chairperson

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Maidu

Greenville

, CA 95947

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(530) 284-6612 - Fax

Susanville , CA 96130

United Auburn Indian Community of the Auburn Rancheria

David Keyser, Chairperson

10720 Indian Hill Road

Maidu

Auburn

, CA 95603

Miwok

530-883-2390

530-883-2380 - Fax

Maidu Nation

Clara LeCompte

P.O Box 204

Maidu

Maidu Cultural and Development Group

Lorena Gorbet

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Maidu

Greenville , CA 95947

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This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for proposed SCH# 2011052062 #Sutter Basin Feasibility Study and Feather River West Levee Project; Sutter and Butte Counties.

Native American Contact List

Sutter and Butte Counties July 15, 2011

KonKow Valley Band of Maidu Patsy Seek, Chairperson

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KonKow / Concow

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Maidu

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Berry Creek Rancheria of Maidu Indians Jim Edwards, Chairperson

#5 Tyme Way

Tyme Maidu

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(530) 534-1151 FAX

T si-Akim Maidu Eileen Moon, Vice Chairperson 760 So. Auburn St. Ste 2-C Maidu Grass Valley, CA 95945 (530) 477-0711

Enterprise Rancheria of Maidu Indians Art Angle, Vice Chairperson 3690 Olive Hwy Maidu

Enterprise Rancheria of Maidu Indians

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Strawberry Valley Rancheria Cathy Bishop, Chairperson

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Miwok

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, CA 95966 Oroville eranch@cncnet.com

Glenda Nelson, Chairperson

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530-883-2320 - Fax

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Native American Contact List

Sutter and Butte Counties July 15, 2011

Mechoopda Indian Tribe of Chico Rancheria Mike DeSpain, Director - OEPP

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(530) 899-8517 - Fax

April Wallace Moore

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Nisenan - So Maidu

Colfax

, CA 95713

Konkow

530-637-4279

Washoe

United Auburn Indian Community of the Auburn Rancheria Gregory S. Baker, Tribal Administrator 10720 Indian Hill Road Maidu , CA 95603 Miwok Auburn gbaker@auburnrancheria. 530-883-2390

530-883-2380 - Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for proposed SCH# 2011052062 *Sutter Basin Feasibility Study and Feather River West Levee Project; Sutter and Butte Counties.



Serving Sutter and Yuba Counties

1007 Live Oak Blvd. Suite B-3 Yuba City, CA 95991 (530) 634-7659 FAX (530) 634-7660 www.fragmd.org

David A. Valler, Jr. **Air Pollution Control Officer**

June 30, 2011

Ingrid Norgaard, Project Manager Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

Matt Davis, Environmental Resources Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, CA 95814

Re: Notice of Preparation of Draft Environmental Impact Statements/Environmental Impact Reports for the Sutter Basin Feasibility Study and Feather River West Levee Project.

Dear Ms. Norgaard and Mr. Davis,

The Feather River Air Quality Management District (District) appreciates the opportunity to review and comment on the above referenced project.

The project site is partially located in Sutter County, which is currently designated as nonattainment for Federal PM_{2.5} ambient air quality standards, nonattainment-transitional for State 1-hour and 8-hour ozone standards, and nonattainment for State PM₁₀ standards. The District would like to make the following recommendations regarding the scope and content of the environmental information for these two projects in regards to air quality and climate change:

Construction Phase

A project of this type is considered a Type 2 project under the District's CEQA Guidelines (http://www.fraqmd.org/PlanningTools.htm). This size project will likely generate constructionrelated air quality impacts that exceed the District's adopted thresholds of significance. An air quality analysis should be performed to determine the impact of the project. The District recommends the Roadway Construction Emissions Model (Version 6.3.2, July 2009) developed by the Sacramento Metropolitan Air Quality Management District, available at http://www.airquality.org/ceqa/index.shtml. If the impacts are found to be significant, the District recommends the measures listed on Attachment C Best Available Construction Phase Mitigation Measures, and the construction equipment mitigation measure on Attachment E.

Some special considerations for construction phase of this project may include an analysis of the impacts to sensitive receptors located within 1,000 feet of the project site, compliance with state regulations prohibiting the excessive idling of on-road and off-road diesel-fueled vehicles, and ensuring that all portable engines greater than 50 horsepower be registered with the California Air Resources Board or obtain a District permit. For information on obtaining a District permit, please contact Mr. Timothy Mitro, Air Quality Engineer, at (530) 634-7659 ext 208.

Operational Phase

Any air quality impacts from this project are likely to occur during the construction phase as this is a Type 2 project.

Greenhouse Gas and Climate Change Impacts

The District recommends the EIR/EIS include a discussion of greenhouse gas emissions and climate change impacts. Currently, the District has not adopted thresholds of significance for GHG emissions. However, the California Air Pollution Control Officers Association (CAPCOA) publication CAPCOA CEQA & Climate Change provides guidance on addressing a project's impact on climate change (www.capcoa.org). Other resources for addressing Climate Change under CEQA are listed in Chapter 8 of the District's Guidelines (http://www.fragmd.org/PlanningTools.htm).

District Rules and Regulations

All projects are subject to District rules and regulations. Some rules and regulations that may apply to this project are:

- Rule 3.0 Visible Emissions
- Rule 3.16 Fugitive Dust Emissions
- Rule 4.1 Permit Requirements

A complete listing of District rules and regulations is available at http://www.arb.ca.gov/drdb/fr/cur.htm.

The project should also submit a Fugitive Dust Control Plan to the District prior to beginning work. The Fugitive Dust Control Plan and supporting documentation are included with this comment letter as Attachments A, B, & D.

If you need further information or assistance, please contact me at (530) 634-7659 x210. Air District staff will be available to assist the project proponent or Lead Agency as needed.

Sincerely,

Sondra Andersson Spaethe

Air Quality Planner

Enclosures: Attachments A, B, C, D & E

File: Chron

Attachment A: Feather River Air Quality Management District Fugitive Dust Control Plan

This plan, upon signature and submittal to the FRAQMD, will serve as an approved Fugitive Dust Control Plan to be implemented at the designated site. This plan must be submitted by the project proponent and received at the air district prior to start of work.

The approved plan serves as an acknowledgment by the project proponent of their duty to address state and local laws governing fugitive dust emissions and the potential for first offense issuance of a Notice of Violation by the air district where violations are substantiated by District staff. This plan (along with standard mitigation measures for all projects and best available mitigation measures where applicable) shall be made available to the contractors and construction superintendent on the project site.

• Site Location:				
• Project Type (circle all that app	ly): Residential	Commercial	Industrial	Transportation
• List of responsible persons:				
Company:				
Office (name, title, address, pho	one):			
Field (name, title, phone):				
 Projected Start and End Dates: (Day/Month/Year) 	1	- 1511 15 7		
Project Proponent:		Charles No. Charles		
	Printed Name		Com	pany/Phone
Signature:		Title:		
By signing this document I acknow local fugitive dust emission laws ar ensure that appropriate materials and dust mitigation measures (Attachme	nd understand that ad instructions are	t it is my respon available to si	nsibility as the employees	ne project proponent to s to implement fugitive
I further acknowledge that it is my of fugitive dust control laws, requir measures are to be implemented at	ements, and avail the site as necess	able mitigation ary to prevent f	techniques, ugitive dust	and that appropriate

Please Submit to: FRAQMD, 1007 Live Oak Blvd. Suite B-3, Yuba City, CA 95991 Attn: Planning Phone: 530-634-7659 x210 FAX: 530-634-7660 Email: sspaethe@fraqmd.org

Attachment B Feather River Air Quality Management District

Standard Construction Phase Mitigation Measures for All Projects

- 1. Mandatory: Implement the Fugitive Dust Control Plan
- 2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a Notice of Violation.
- 3. The primary contractor shall be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.
- 4. Minimize idling time to 5 minutes saves fuel and reduces emissions. (State idling rule: commercial diesel vehicles- 13 CCR Chapter 10 Section 2485 effective 02/01/2005; off road diesel vehicles- 13 CCR Chapter 9 Article 4.8 Section 2449 effective 05/01/2008)
- 5. Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.
- 6. Develop a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.
- 7. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require California Air Resources Board (ARB) Portable Equipment Registration with the State or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with the ARB or the District to determine registration and permitting requirements prior to equipment operation at the site.

Attachment C

Feather River Air Quality Management District FUGITIVE DUST CONTROL - BEST AVAILABLE MITIGATION MEASURES

TO BE USED IN ADDITION TO STANDARD CONSTRUCTION PHASE MITIGATION MEASURES

Sources: FRAQMD Indirect Source Review Guidelines and Best Available Mitigation Measures compiled by the air districts of the Greater Sacramento Region and approved for implementation by the FRAQMD Board of Directors.

All grading operations on a project should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.

<u>Construction sites shall be watered</u> as directed by the Department of Public Works or Air Quality Management District and as necessary to prevent fugitive dust violations.

An operational water truck should be onsite at all times. Apply water to control dust as needed to prevent visible emissions violations and offsite dust impacts.

Onsite dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.

<u>All transfer processes</u> involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.

<u>Apply approved chemical soil stabilizers</u> according to the manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.

<u>To prevent track-out</u>, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

<u>Paved streets shall be swept</u> frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

<u>Provide temporary traffic control</u> as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 mph.

<u>Reduce traffic speeds</u> on all unpaved surfaces to 15 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.

Reestablish ground cover on the construction site as soon as possible and prior to final occupancy, through seeding and watering.

<u>Disposal by Burning</u>: Open burning is yet another source of fugitive gas and particulate emissions and shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, et. al.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials offsite for disposal by open burning.

_____FRAQMD – Effective 09/09/03_____

Attachment D Feather River Air Quality Management District LOCAL AND STATE REGULATIONS APPLICABLE TO FUGITIVE DUST

I. FRAQMD Rules and Regulations

Note: The following District Rules and Regulations are enforced for each project regardless of lead agency or Board approved project CEQA mitigation requirements.

FRAQMD RULE 3.0 - VISIBLE EMISSIONS (Adopted 6/91)

As provided by Section 41701 of the California Health and Safety Code, a person shall not discharge into the atmosphere from any single source of emissions whatsoever, any air contaminants for a period or periods aggregating more than three minutes in any one hour which is:

- a. As dark or darker in shade as that designated as No. 2 on the Ringlemen Chart, as published by the United States Bureau of Mines; or
- b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection 'a' above.

Enforcement: The District has trained staff capable of performing a Visible Emissions Evaluation (VEE). VEE courses are offered to regulators and the regulated community (for a fee) at regular intervals by staff of the California Air Resources Board.

FRAOMD RULE 3.16 - FUGITIVE DUST EMISSIONS (Adopted 4/11/94)

A. PURPOSE

The purpose of this Rule is to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere.

B. DEFINITION

For the purpose of this Rule, the following definitions shall apply:

- B.1 Fugitive Dust: Solid airborne matter emitted from any non-combustion source.
- B.2 Emergency: Any act of God, but only if the owner of the property from which fugitive dust emissions originate establishes for the Feather River Air Quality Management District, by a preponderance of evidence, that he or she took reasonable precautions in light of the relevant facts and circumstances to minimize emissions.
- B.3 Property Line: Adjacent properties which are owned by the same person shall be considered the same property for the purpose of determining the property line.

C. REQUIREMENTS

A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

Reasonable precautions shall include, but are not limited to:

C.1 use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land; C.2 application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;

C.3 other means approved by the Air Pollution Control Officer.

D. EXEMPTIONS

The provisions of this Rule shall not apply to the following:

- D.1 Agricultural Operations
- D.2 Currently unworked land designated as reclaimed for agriculture
- D.3 An Emergency
- D.4 Unpaved roads open to public travel (this inclusion shall not apply to industrial or commercial facilities).

II. State Laws

California Health and Safety Code

Section 41700. Except as otherwise provided in Section 41705, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Section 41701. Except as otherwise provided in Section 41704, or Article 2 (commencing with Section 41800) of this chapter other than Section 41812, or Article 2 (commencing with Section 42350) of Chapter 4, no person shall discharge into the atmosphere from any source whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is: (a) As dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the United States Bureau of Mines, or (b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subdivision (a).

California Vehicle Code

Section 23114 requires: No vehicle shall transport any aggregate material upon a highway unless the material is covered. Exception 23114(e)(4): Vehicles transporting loads of aggregate materials shall not be required to cover their loads if the load, where it contacts the sides, front, and back of the cargo container area, remains six inches from the upper edge of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area. For purposes of this section, "aggregate material" means rock fragments, pebbles, sand, dirt, gravel, cobbles, crushed base, asphalt, and other similar materials.

Attachment E: Reducing ROG, NOx, & PM emissions from off-road diesel powered equipment

This mitigation measure may be used by projects to mitigate emissions of Reactive Organic Gases (ROG), Oxides of Nitrogen (NOx), and/or Particulate Matter (PM). The results of the Construction Mitigation Calculator shall be submitted and approved by the District PRIOR TO BEGINNING WORK.

The proponent shall assemble a comprehensive inventory list (i.e. make, model, engine year, horsepower, emission rates) of all heavy-duty **off-road** (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure:

The project shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 horsepower) **off-road equipment** to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 5 percent ROG reduction, 20 percent NOx reduction and 45 percent particulate reduction compared to the most recent CARB fleet average at time of construction. A Construction Mitigation Calculator (MS Excel) may be downloaded from the SMAQMD web site to perform the fleet average evaluation http://www.airquality.org/ceqa/index.shtml.

Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), after-treatment products, voluntary offsite mitigation projects, provide funds for air district offsite mitigation projects, and/or other options as they become available. The District should be contacted to discuss alternative measures.



California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114 (916) 464-3291 • FAX (916) 464-4645 http://www.waterboards.ca.gov/centralvalley

20 June 2011

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento. CA 95814 CERTIFIED MAIL 7010 1670 0002 0652 8212

COMMENTS TO THE NOTICE OF PREPARATION OF THE DRAFT ENVIRONMENTAL IMPACT REPORT, SUTTER BASIN FEASIBILITY STUDY AND FEATHER RIVER WEST LEVEE PROJECT, SCH NO.2011052062, SUTTER COUNTY

Pursuant to the State Clearinghouse's 20 May 2011 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Notice of Preparation of the Draft Environmental Impact Report* for the Sutter Basin Feasibility Study and Feather River West Levee Project, located in Sutter County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Sutter Basin Feasibility Study and Feather River West Levee Project SCH No. 2011052062 Sutter County

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits¹

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water issues/storm water/municipal permits/

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water issues/storm water/industrial general per mits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed for the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916)557-5250.

Clean Water Act Section 401 Permit - Water Quality Certification

If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. Water Quality Certification must be obtained prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

¹ Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Waste Discharge Requirements

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

If you have questions regarding these comments, please contact me at (916) 464-4745 or gsparks@waterboards.ca.gov.

Genevieve (Gen) Sparks

Environmental Scientist ·

401 Water Quality Certification Program

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cc: State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento



California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114 (916) 464-3291 • FAX (916) 464-4645 http://www.waterboards.ca.gov/centralvalley

6 July 2011

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814 CERTIFIED MAIL 7010 3090 0001 4843 2695

COMMENTS TO THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, SUTTER BASIN FEASIBILITY STUDY PROJECT, SCH NO. 2011052085, SUTTER AND BUTTE COUNTIES

Pursuant to the State Clearinghouse's 22 June 2011 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Notice of Preparation for the Draft Environmental Impact Report* for the Sutter Basin Feasibility Study Project, located in Sutter and Butte Counties.

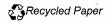
Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml



Phase I and II Municipal Separate Storm Sewer System (MS4) Permits¹

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water issues/storm water/municipal permits/

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_per_mits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed for the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916)557-5250.

Clean Water Act Section 401 Permit - Water Quality Certification

If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. Water Quality Certification must be obtained prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require

¹ Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water issues/water quality certification/

If you have questions regarding these comments, please contact me at (916) 464-4745 or gsparks@waterboards.ca.gov.

Genevieve (Gen) Sparks Environmental Scientist

401 Water Quality Certification Program

Generieur Spacks

cc: State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office 2800 Cottage Way, Room W-2605 Sacramento, California 95825-1846



In reply refer to: 81420-2011-TA-0619-01

JUN 30 2011

Mr. Matt Davis Environmental Resources Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, CA 95814

Subject:

Yuba-Sutter Habitat Conservation Plan/Natural Community Conservation Plan,

Yuba and Sutter Counties, California

Dear Mr. Davis:

The U.S. Fish and Wildlife Service (Service) has received your Notice of Preparation of Draft Environmental Impact Statements/Environmental Impact Reports for the Sutter Basin Feasibility Study and Feather River West Levee Project dated May 20, 2011 (ER 11/464). The Service would like to assist you in your planning efforts, so we are providing this notification that Yuba and Sutter Counties are currently engaged in a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/HCCP). The applicants currently are the counties of Yuba and Sutter, the city of Wheatland, the city of Live Oak, and Yuba City. This is a multi-year planning process that was initiated as a result of indirect effects from the Upgrade of State Route 70 project (Service file numbers 1-1-00-F-0224 and 1-1-02-F-0069) and it includes the majority of Yuba and Sutter Counties. We would be happy to provide you with additional information upon your request.



Mr. Matt Davis 2

The Service wishes to thank you for your continued efforts and dedication to the conservation of America's wildlife resources. Please contact Ellen R. McBride or Mike Thomas at (916) 414-6630 if you have questions regarding this response. Please refer to Service file number 81420-2011-TA-0619 in any future correspondence.

Sincerely,

Michael Thomas

Eric Tattersall

Deputy Assistant Field Supervisor

cc:

Ms. Ingrid Norgaard, Sutter Butte Flood Control Agency, Sacramento, CA 95814

Mr. Steve Schoenberg, U.S. Fish and Wildlife Service, Sacramento, CA 95825

Ms. Loretta Sutton, Office of Environmental Policy and Compliance, Washington, DC 20240



California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



415 Knollcrest Drive, Suite 100, Redding, California 96002 (530) 224-4845 • Fax (530) 224-4857 http://www.waterboards.ca.gov/centralvalley

31 May 2011

Ingrid Norgaard Sutter Butte Flood Control Agency c/o ICF International 630 K Street, Suite 400 Sacramento, CA 95814

COMMENTS ON THE NOTICE OF PREPARATION FOR PROPOSED SUTTER BASIN FEASIBILITY STUDY & FEATHER RIVER WEST LEVEE PROJECT, BUTTE COUNTY

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is a responsible agency for this project, as defined by the California Environmental Quality Act (CEQA). On 23 May 2011, we received your request for comments on the Notice of Preparation for the Sutter Basin Feasibility Study & Feather River West Levee Project.

Sutter Butte Flood Control Agency has two efforts presently underway to study flood risk reduction improvements in Sutter and Butte Counties, one known as the Sutter Basin Feasibility Study, sponsored by the U.S. Army Corps of Engineers to determine federal interest in flood risk reduction projects, and one known as the Feather River West Levee Project, sponsored by the Sutter Butte Flood Control Agency as a locally driven flood risk reduction project.

USACE initiated the Sutter Basin project in 2001 and is conducting a feasibility study to evaluate flood damage reduction, ecosystem restoration, and recreation opportunities within the study area. The Central Valley Flood Protection Board and SBFCA, in their roles as non-federal local sponsors, are coordinating with USACE on the feasibility study. USACE, acting as the federal lead agency under NEPA, and SBFCA, acting as the state lead agency under CEQA, have determined that an EIS/EIR will be prepared to describe alternative, potential environmental effects, and mitigation measures.

SBFCA is planning the FRWLP to address levee deficiencies in the west levee of the Feather River from Thermalito Afterbay to the Sutter Bypass confluence to meet federal, state, and local flood protection criteria and goals. In 2010, an assessment district was enacted to provide local funding toward flood management improvements. These funds will be matched with those from the Disaster Preparedness and Flood Prevention Bond Act of 2006. The purpose of the FRWLP would be to construct improvements as quickly as possible in advance of and compatible with the Sutter Basin Feasibility Study.

California	Environmentai	Protection	Agency
CONTRACTOR CONTRACTOR			

Based on our review of the information submitted for the proposed project, we have the following comments:

Clean Water Act (CWA) Section 401, Water Quality Certification

The Central Valley Water Board has regulatory authority over wetlands and waterways under both the Federal Clean Water Act (CWA) and the California Water Code, Division 7 (CWC). Discharge of dredged or fill material to waters of the United States requires a CWA Section 401 Water Quality Certification from the Central Valley Water Board. Typical activities include any modifications to these waters, such as stream crossings, stream bank modifications, filling of wetlands, etc. 401 Certifications are issued in combination with CWA Section 404 Permits issued by the Army Corps of Engineers. The proposed project must be evaluated for the presence of jurisdictional waters, including wetlands and other waters of the State. Steps must be taken to first avoid and minimize impacts to these waters, and then mitigate for unavoidable impacts. Both the Section 404 Permit and Section 401 Water Quality Certification must be obtained prior to site disturbance.

Isolated wetlands and other waters not covered by the Federal Clean Water Act
Some wetlands and other waters are considered "geographically isolated" from navigable waters and are not within the jurisdiction of the Clean Water Act. (e.g., isolated wetlands, vernal pools, or stream banks above the ordinary high water mark). Discharge of dredged or fill material to these waters may require either individual or general waste discharge requirements from the Central Valley Water Board. If the U.S. Army Corps of Engineers determine that isolated wetlands or other waters exist at the project site, and the project impacts or has potential to impact these non-jurisdictional waters, a Report of Waste Discharge and filing fee must be submitted to the Central Valley Water Board. The Central Valley Water Board will consider the information provided and either issue or waive Waste Discharge Requirements. Failure to obtain waste discharge requirements or a waiver may result in enforcement action.

Any person discharging dredge or fill materials to waters of the State must file a report of waste discharge pursuant to Sections 13376 and 13260 of the CWC. Both the requirements to submit a report of waste discharge and apply for a Water Quality Certification may be met using the same application form, found at:

http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/wqc_appl ication.pdf

General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (CGP)

Construction activity, including demolition, resulting in a land disturbance of one acre or more must obtain coverage under the CGP. The Sutter Basin Feasibility Study & Feather River West Levee Project must be conditioned to implement storm water pollution controls during construction and post-construction as required by the CGP. To apply for coverage under the CGP the property owner must submit Permit Registration Documents electronically prior to construction. Detailed information on the CGP can be found on the State Water Board website: http://www.waterboards.ca.gov/water_issues/programs/stormwater/gen_const.shtml

Dewatering Alternative 1: Discharge to Storm Drains or Waters of the United States
A dewatering permit, General Order for Dewatering and Other Low Threat Discharges to
Surface Waters, (Central Valley Water_Board Order No. R5-2008-0082, adopted
12 June 2008) may be required for pump testing, pipeline dewatering and/or construction
activities. This general NPDES (National Pollutant Discharge Elimination System) permit
covers the discharge to waters of the United States of clean or relatively pollutant-free
wastewater that poses little or no threat to water quality. The following categories are covered
by the dewatering permit: well development water; construction dewatering; pump/well testing;
pipeline/tank pressure testing; pipeline/tank flushing or dewatering; condensate discharges;
water supply system discharges; miscellaneous dewatering/low threat discharges. The
dewatering permit applies only to direct discharges to waters of the United States Failure to
obtain a dewatering permit, when required, may result in enforcement action. An application
form and a copy of the permit are available at this office.

Dewatering Alternative 2: Discharges to Land

Construction and system test dewatering discharges that are contained on land (i.e., will not enter waters of the United States) are allowed under Central Valley Water_Board Resolution No. 2003-0003-DWQ provided the following conditions are met: (1) the dewatering discharge is of a quality as good as or better than underlying groundwater; and (2) there is a low risk of nuisance. Examples of dewatering discharges to land include a terminal basin, irrigation (with no return to waters of the United States), and dust control. You may request written confirmation from this office that the waiver is applicable.

If you have any questions or comments regarding this matter please contact me at (530) 224-4784 or by email at szaitz@waterboards.ca.gov.

Scott A. Zaitz, R.E.H.S.

Scott A. Zait

Environmental Scientist

Storm Water & Water Quality Certification Unit

SAZ: wrb/jmtm

cc: Mr. Will Ness, U.S. Army Corp of Engineers, Sacramento Department of Fish and Game, Region 2, Rancho Cordova State Clearing House Number (2011052062), Sacramento State Water Resources Control Board, Sacramento

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Appendix C

Flood Control and Geomorphic Conditions Supplemental Environmental Setting, Flood Control and Geomorphic Reports

Part C.1

Additional environmental setting information in support of Section 3.1, *Flood Control and Geomorphic Conditions*

Parts C.2, C.3, C.4, and C.5

William Lettis and Associate's Surficial Geologic Maps and Geomorphic Assessment of the Sutter Study Area, Urban Levee Geotechnical Evaluation, Sutter and Butte Counties, California

From URS Supplemental Geotechnical Data Report (2010), Appendix O, Volumes 2 through 5

Part C.1 **Supplemental Environmental Setting**

Supplemental Environmental Setting

This appendix provides additional environmental setting information in support of Section 3.1, *Flood Control and Geomorphic Conditions.*

C.1.1 Flooding

C.1.1.1 Flood Basins of the Sacramento Valley

The importance of natural flood basins to the Sacramento Valley river system was recognized by Gilbert as early as 1917 (Gilbert 1917; Water Engineering & Technology 1990:32–33). Flood basins in the Sacramento Valley were originally delineated by Gilbert. More recently, Ayres Associates (2008:16–17) divided the entire Sacramento River basin into potential flooded areas, based on the land that would be flooded if a levee failure occurs. The Sacramento River basin was divided into 26 sub-basins (Ayres Associates 2008:16–17, Figures 5 and 6).

Gilbert (1917) and discussed in Water Engineering & Technology (1990:32–33) described these flood basins as being inundated annually by floodwaters. The Sacramento River was separated from the flood basins by natural levees; however, at high water, these levees were easily overtopped. The lower 25 miles of the Feather River (approximately 18 miles of which are in the proposed project area) is also bounded by flood basins (Water Engineering & Technology 1990:32–33).

Hall (1880 as cited in Water Engineering & Technology 1990:32–34) describes the inundation of the flood basins during the flood of 1879:

During the high water of March 1879, the low lands of the Sacramento Valley, to the extent of about 847 square miles, were covered with water; this area includes all flooded for a short period of time, as well as that upon which the water rested for several months. Above the mouth of the Feather River, in what may be called the upper flood region, the area covered was about 483 square miles; and below that point, in what is called the lower flood region, the flooded area was about 364 square miles in extent.

Gilbert (1917:15) emphasized the hydrologic significance of the natural flood basins:

The lateral basins affected the channel characters in important ways. They conveyed a large part of the flood discharge and thus left for adjacent portions of the channel only a small part. They acted as reservoirs for the storage of floodwaters and fed them gradually to the lower course of the Sacramento, so that the channels in the delta region were only moderately taxed by the floods. The channels in consequence were adjusted for conveyance of only a fraction of the flood discharge; they were of moderate section and their meanders were of small radius. Between the town of Colusa and the mouth of the Feather River the Sacramento River grows gradually smaller downstream until its estimated capacity is only 10 per cent of the flood discharge.

Because the flood basins have been maintained as topographic lows even though there has been extensive overbank deposition, it is evident that the flood basins have been subsiding at a rate equal to or exceeding that of overbank deposition (Gilbert 1917; Water Engineering & Technology 1990:34; Water Engineering & Technology 1989 as cited in Water Engineering & Technology 1990:34; Harvey 1988 as cited in Water Engineering & Technology 1990:34). Such widespread

subsidence perhaps is driven by ongoing structural deformation of the Sacramento Valley. Offset on the Willows fault could have generated an east-dipping topographic gradient on the eastern, upthrust block. Rotation of the downthrust block could have generated a similar gradient (Water Engineering & Technology 1990:34–35). See Section 3.3, *Geology, Soils, Seismicity, and Mineral Resources*, for further information about land subsidence in the proposed project area.

In brief, the Sacramento Valley flood basins play a key role in the fluvial geomorphology and hydrology of the Feather River. Most importantly, suspended sediment that historically has been deposited in the flood basins has produced a thick, cohesive stratigraphic assemblage, which adds to the bank stability of the lower Feather River. The significance of these flood basin deposits increases downstream as the topographic lows become more prevalent (Water Engineering & Technology 1990:35).

C.1.2 Geomorphic Conditions

C.1.2.1 Channel Network Classification

Valley morphology varies going downstream in most watersheds, such as the Feather River watershed. Because of this variation, watersheds are divided into valley segments and channel reaches. Valley segments are distinctive sections of the valley network that possess geomorphic properties and hydrologic transport characteristics that distinguish them from adjacent reaches (Bisson and Montgomery 1996:26).

Valley segments can be classified into three classes based on their position within the watershed and the relative ratios of transport capacity to sediment supply (Montgomery and Buffington 1998:23–24). Headwater source areas typically are transport-limited (often because of limited channel runoff) but do offer sediment storage that is intermittently initiated under large flow events, debris flows, or other gravitational events (e.g., landslides). Transport segments are composed of morphologically resilient, supply-limited reaches (e.g., bedrock, cascade, step-pool) that rapidly convey increased sediment inputs. Response segments consist of lower-gradient, more transport-limited depositional reaches (e.g., plane-bed, pool-riffle, step-pool sequences) where channel adjustments occur in response to changes in sediment supply delivered from upstream.

Based on field observations, literature review, and the stream classification methodologies described above, the Feather River in the proposed project area is an alluvial valley segment dominated by plane-bed and pool-riffle reaches. Plane-bed and pool-rifle reaches are transport-limited; therefore, the Feather River behaves as a response segment, theoretically adjusting its bed morphology to water and/or sediment. In general, it can be described as a sediment-laden, low-sinuosity stream.

C.1.2.2 Reach-Specific Geomorphic Conditions

From the Feather River's confluence with the Yuba River to river mile (RM) 7, levees confine the river within the Sutter Bypass. During flooding, overflow from the Sacramento River can enter the river through the Bypass and a backwater can form. The bed is made up of moving bars of sand, which can become mobile even during summer irrigation season (Foothill Associates 2010).

From RM 7 to RM 12.5, the Feather River is characterized by the presence of alternate gravel bars on the channel margins and large sand waves within the channel. The frequency of these sand waves increases upstream from Nicolaus. From RM 12.5 to RM 17, near the confluence with the Bear River, the Feather River is relatively wide and straight, and the upper bank sediments are composed of highly erodible, non-cohesive hydraulic mining-derived sands (Water Engineering & Technology 1990:8). For the most part, the bank on one side of the river consists of floodplain silt and sand overlying slickens, while the opposite bank is made up of active point bar deposits of sand with some silt, which indicates that some bank erosion and channel migration is occurring (Foothill Associates 2010). Fluvial entrainment and dry gravel of upper bank sediments are common; however, the resistance of the toe bank, composed of fine-grained hydraulic mining debris (slickens), contributes to planform stability (Water Engineering & Technology 1990:8).

From RM 17 to RM 28, the resistant Pleistocene Modesto Formation commonly forms the channel banks of the Feather River so that channel planform is relatively stable. Several distinct bendways are present within this reach (Water Engineering & Technology 1990:8). These large meanders occur near the bottom of the reach. The banks are made up mostly of floodplain deposits and the beds mostly of sand. The Shanghai Bend, a bench-like outcrop that forms a rapid, with a near-vertical drop of several feet in places, occurs in this reach (Foothill Associates 2010).

Near the confluence with the Yuba River, the Feather River is influenced by backwater effects from the Yuba River, which cause the river to become relatively straight with minimal bank instability and fewer meanders. The floodplain here, confined by older natural levee terrace deposits and built levees, is typically less than 1 mile across. The bed is sand and the banks are made up of floodplain deposits. There are few point bars or other depositional features and only a single channel (Foothill Associates 2010). From RM 29 to RM 61 (near Oroville), the levee embankment system is set back and the river occupies a wide meander belt similar to the Sacramento River upstream of Colusa. In general, the Feather River is a sand- to fine gravel–dominated, high-sinuosity channel upstream of Marysville to about RM 56. Upstream of RM 56, sinuosity decreases, split flow around mid-channel gravel bars is common, and sediment is dominated by coarse gravel to cobble-sized sediment. The river is bordered by gold mining dredge spoils in this upper reach (Water Engineering & Technology 1991:139–140).

More specifically, from RM 29 to RM 45, the Feather River is a sinuous meandering channel whose bed material is dominated by sand to fine gravel–sized sediment. The sediment coarsens gradually upstream through the reach. The river is highly dynamic and contains large point bars and chute channels. Bank erosion is extensive; however, wide levee setback precludes direct levee threat. Where the channel flows close to the levees, the resistant Pleistocene Modesto Formation commonly composes the channel banks (Water Engineering & Technology 1991:139–140). This section of river is unlike the other reaches because of its high sinuosity, active bank erosion, and point bar formation. These point bars are made up primarily of sand and minor gravel and are not armored. Meander cutoffs have occurred here and will likely continue to occur. The instability of this reach is likely related to the relatively fine composition (sand to fine gravel) of the bed and banks (Foothill Associates 2010).

From RM 45 to 54, high-flow sinuosity is low, split flow is common, and bed and bar sediment is dominated by gravel to cobble-sized material. This reach has a very high sediment load because of the presence of dredge spoils upstream. From RM 54 to RM 61, the Feather River flows through gold mining dredge spoils. The channel banks generally are composed of the spoils, which are dominated by sand to cobble-sized sediment. The river has been controlled within linear spoils piles so that the

spoils border the river directly for several miles. As a result, sinuosity is low in this uppermost reach (Water Engineering & Technology 1991:139–140).

C.1.2.2.1 Surficial Geology

Previous geologic mapping in the southern proposed project area along the Feather River and surrounding areas generalize the surficial deposits as: Quaternary Alluvium (map unit Qa) and Quaternary stream channel deposits (map unit Qsc) within and proximal to the modern Feather River channel, (Helley and Harwood 1985). These map units are considered Holocene age (less than 11,000 years old). Late Quaternary Modesto Formation (map units Qmu, Qml) is mapped along the western margin of the floodplain.

Previous geologic mapping along the northern Feather River and surrounding areas generalizes the surficial deposits as: Quaternary alluvium (map unit Qa) and Quaternary stream channel deposits (map unit Qsc), which are mapped within and proximal to the modern Feather River channel (Bussaca et al. 1989 as cited in Appendix O of Volume 4 of URS 2010:3 [included in this report as Appendix C, part C.4]; Creely 1965 as cited in Appendix O of Volume 4 of URS 2010:3; Helley and Harwood 1985). These map units are considered Holocene in age (less than 11,000 years old). Late Pleistocene Modesto Formation (map units Qmu, Qml) is present as an escarpment along the western margin of the floodplain.

These map units were delineated by Helley and Harwood (1985) at a regional scale (1:62,500). A more current analysis of the Feather River area by William Lettis & Associates uses this existing geologic framework as a basis for more detailed mapping of late Holocene alluvium and geomorphic features (see Plate 1 of Appendix O of Volumes 4 and 5 of URS 2010 [included in this report as Appendix C, parts C.4 and C.5, and Plate 3.3-1 of this document).

The surficial geologic map units in and adjacent to the Feather River are described in Appendix O, "Geomorphology Report," in Volumes 4 and 5 of the URS (2010) report (included in this report as Appendix B). Additionally, for a description of surficial geologic units, refer to Section 3.3, *Geology, Soils, Seismicity, and Mineral Resources*.

Lower Feather River

Published geologic maps of the lower Feather River identify a complex series of westward aggrading alluvial fans and terraces derived from the Sierra Nevada, identified as the Riverbank and Modesto Formations. The Riverbank Formation and Modesto Formation are semi-consolidated to unconsolidated deposits characterized by intra-formational paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. The Riverbank Formation unconformably overlies the Laguna Formation, which is a deeply dissected alluvial surface (Busacca et al. 1989 as cited in Appendix O of Volume 4 of URS 2010:5) (Appendix O of Volume 4 of URS 2010:5) [included in this report as Appendix B]).

Subsurface deposits about 150 feet beneath the ground surface rest on a resistant volcanic tuff capped by interbedded alluvial gravel, sand, and silt, interpreted as Pliocene-Pleistocene age Laguna Formation that represents a period of relatively stable landscape conditions (Helley and Harwood 1985). The Laguna Formation is overlain by the Pleistocene Riverbank Formation, (very dense gravel deposits), which are, in turn, overlain by a medium dense sand and gravelly sand assemblage of the latest Pleistocene Modesto Formation (Busacca et al. 1989 as cited in Appendix O of Volume 4 of URS 2010:5 [included in this report as Appendix B]). The upper member of the Modesto

Formation is exposed at the ground surface adjacent to the western bank of the Feather River south of Marysville and Yuba City. The Modesto Formation is mantled by unconsolidated deposits of Holocene age that compose most of the surficial geologic deposits along the western side of the Feather River (Plate 1 of Appendix 0 of Volume 4 of URS 2010 [included in this report as Appendix B] and Plate 3.3-1 of this document) (Appendix 0 of Volume 4 of URS 2010:5).

Upper Feather River

Published geologic maps of the upper Feather River show a complex series of westward aggrading alluvial fans and terraces derived from erosion of the Sierra Nevada, identified as the Riverbank and Modesto Formations (Bussaca et al. 1989 as cited in Appendix O of Volume 5 of URS 2010:5 [included in this report as Appendix B]; Helley and Harwood 1985; Creely 1965 as cited in Appendix O of Volume 5 of URS 2010:5 [Appendix B]). The Riverbank Formation and Modesto Formation in general are semi-consolidated to unconsolidated deposits characterized by intra-formational paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. The oldest map unit, the Riverbank Formation unconformably overlies the Pliocene-Pleistocene age Laguna Formation, which consists of interbedded alluvial gravel, sand and silt (Busacca et al. 1989 as cited in Appendix O of Volume 5 of URS 2010:6 [Appendix B]; Helley and Harwood 1985). The overlying Pleistocene Riverbank Formation consists of very dense gravel deposits that are, in turn, overlain by a medium dense sand and gravelly sand package of the latest Pleistocene Modesto Formation (Busacca et al. 1989 as cited in Appendix O of Volume 5 of URS 2010:6 [included in this report as Appendix B]). The upper member of the Modesto Formation is exposed at the ground surface adjacent to the western bank of the Feather River. The Modesto Formation is locally mantled by unconsolidated, sand-rich Holocene deposits (Plate 1 of Appendix O of Volume 5 of URS 2010 [included in this report as Appendix B] and Plate 3.3-1 of this document). East of the Feather River, the older stratigraphic units are uplifted and dissected and younger deposits are inset into them with older deposits buried beneath younger deposits. West of the Feather River, the stratigraphic units are found in typical succession. This is the result of overall westward tilting and uplift of the Sierra Nevada, incision along the tributary drainages (i.e. Honcut creek), and progradational fan deposition west of the river (Appendix O of Volume 5 of URS 2010:5-6 [Appendix B]).

Surficial geologic mapping (Plate 1 of Appendix O of Volume 5 of URS 2010 [included in this report as Appendix B], and Plate 3.3-1 of this document) shows differences in deposit type and distribution from north to south along the northern Feather River proposed project area that primarily are associated with proximity to the Sierra Nevada mountain front near Thermalito Afterbay. These differences illustrate the diversity of past geomorphic processes along the river and, as a consequence, the type of geologic deposits at and near the ground surface. The surficial geologic map created by William Lettis & Associates allows the delineation of reaches along the river within which geomorphic processes and their associated deposits appear to be relatively consistent (Appendix O of Volume 5 of URS 2010:5–6 [included in this report as Appendix B]).

C.1.2.3 Channel Incision

Thalweg (channel centerline) profiles for the lower Feather River are shown in Figure 5.13 of Water Engineering & Technology (1990:81). The data sets incorporated in this figure represent 1911, 1924, and 1965 surveys. The profiles illustrate a degradational trend from 1911 to 1965, which is expected as channel incision into hydraulic mining debris has been documented (Meade 1982 as

cited in Water Engineering & Technology 1990:80). The profiles show approximately 10 feet of degradation between 1924 and 1965 (Water Engineering & Technology 1990:80–81).

The Sutter Bypass has its confluence with the Feather River at RM 7.5 (the bottom of the proposed project area). From this point downstream, approximately 5 feet of incision occurred between 1911 and 1924 versus about 2 feet upstream during the same period. Increased flows introduced by the Sutter Bypass may have served to increase the rate of incision into hydraulic mining debris along this lower reach (Water Engineering & Technology 1990:80–81).

Thalweg profiles for the upper Feather River are shown in Figure 6.8 of Water Engineering & Technology 1991:155. The data sets incorporated in this figure represent 1909 and 1964 surveys. The profiles illustrate a significant degradational trend during this time period, which is expected as channel incision into hydraulic mining debris has been documented (Meade 1982 as cited in Water Engineering & Technology 1990:80). The profiles show the greatest amount degradation (approximately 10 feet) at the lower end of the upper proposed project area. The reason the Feather River in the upper proposed project area has not degraded in the upper reaches is attributable to the sediment supply that is maintained by lateral erosion of the dredge spoils that border the channels. In addition, flow regulation has affected the rate of incision. As only infrequent flows can entrain coarser material, channel incision into the debris is relatively slow. Farther downstream, the lower reaches have degraded because of the presence of finer materials (Water Engineering & Technology 1991:150–156).

C.1.2.4 Sinuosity, Channel Migration, and Bank Failure

In the lower proposed project area, historical observations and present-day channel sinuosity upstream of the Yuba River confluence suggest that the Feather River was more sinuous prior to hydraulic mining than it is today. In general, sinuosity increases with distance upstream. This increase in sinuosity reflects the increase in the upstream presence of the resistant Pleistocene Modesto Formation, which has helped to maintain the channel planform. Present-day sinuosity on the Feather River is not substantially different from that of the 1920s. The channel has incised into cohesive hydraulic mining debris (slickens), which has helped to maintain the channel planform. Additionally, flow regulation by upstream dams in the watershed has contributed to the maintenance of the channel planform. Whether sinuosity of the Feather River will increase back to pre-mining levels is unclear; such an increase is dependent on the depositional thickness of the cohesive toe sediment (slickens). If the river degrades through the slickens and less cohesive sediments compose the lower bank, channel migration rates and sinuosity may increase rapidly. Further evidence for the current planform stability is provided by the presence of the extensive riparian vegetation that is located near the water's edge (Water Engineering & Technology 1990:77–80).

In the upper proposed project area, modes of bank failure and thus channel migration are highly dependent on bank lithology and stratigraphy. Along the Feather River in the upper proposed project area, coarse-grained point bar deposits are commonly preserved in the channel banks; fluvial entrainment of these sediments is followed by cantilever failure of the more cohesive upper bank vertical accretion sediments. Abandoned channel fill deposits form resistant hard points on the channel bank; where these deposits are located in the lower bank, bank retreat over the top of the resistant abandoned channel fill deposits can occur (Water Engineering & Technology 1991:149).

The greatest concentration of eroding banks is between RM 29 to RM 45, where the Feather River is a sinuous meandering channel whose bed material is dominated by sand to fine gravel–sized sediment. The river in this reach is highly dynamic and contains large point bars and chute channels. Bank erosion is extensive; however, as mentioned above, wide levee setback precludes direct levee threat in many locations.

Migration rates in the upper proposed project area are highly variable, reflecting the heterogeneity of materials present, and the range and stages of channel bend development (Harvey 1988 as cited in Water Engineering & Technology 1991:150). Although lateral migration rates are commonly high in the upper proposed project area, levee setback is sufficient so that very little direct levee threat exists (Water Engineering & Technology 1991:139–140).

C.1.2.4.1 Bank Retreat Rates: Feather River (RM 0–28)

Water Engineering & Technology (1990:172–173) conducted an analysis of migration rates for the lower Feather River bank lines. Bankline migration rates (for the west bank) averaged approximately 6 feet of migration per year, with a minimum value of 0 feet per year and a maximum value of 26.5 feet per year. At the time the study was conducted (1990), based on projected migration rates, the lower Feather River levees on the west bank were not anticipated to be threatened over a 15-year interval (Water Engineering & Technology 1990:172). Current-day field observations support this conclusion that bank retreat is slow on this reach, as erosion appears intermittent, the bank toe is cohesive, and mature vegetation is growing along the water's edge.

C.1.2.4.2 Bank Retreat Rates: Feather River (RM 28–61)

Water Engineering & Technology (1991:150–153) conducted an analysis of migration rates for the upper Feather River bank lines. Bankline migration rates (for the west bank) are commonly high (especially between RM 29 to RM 45), with an average of approximately 5 feet of migration per year, with a minimum value of 1.4 feet per year and a maximum value of 20.3 feet per year.

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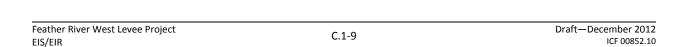
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URS Supplemental Geotechnical Data Report (2010), Appendix O, Volume 2



Geomorphology Report





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September 8, 2009

Mr. Juan Vargas URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento, CA 95833

RE: Surficial geologic mapping and geomorphic assessment, California Department of Water Resources Urban Levees, Wadsworth Canal, Sutter County, California

Dear Mr. Vargas:

This memorandum presents the surficial geologic mapping and preliminary geomorphic assessment of the Wadsworth Canal area, for the California Department of Water Resources (DWR) Urban Project Levees geotechnical characterization. The goal of this mapping and geomorphic assessment is to provide information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees along the canal, with respect to potential levee underseepage. This letter presents the technical approach, surficial geologic map, conceptual geomorphic model, and initial results based on map analysis and preliminary review of Phase 1 geotechnical data.

We appreciated the opportunity to provide these geomorphic and geologic data and preliminary interpretations of the shallow stratigraphic conditions in the Wadsworth Canal study area. Please do not hesitate to call either of the undersigned if there are any questions or comments.

Respectfully,

WILLIAM LETTIS & ASSOCIATES, INC.

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1.0 Approach

The approach to developing a surficial geologic map of the Wadsworth Canal area (Figure 1, Plate 1) consisted of analysis of the following data: Aerial photography (black and white stereo-pairs taken in 1937, ~1:20,000-scale); early topographic maps (USGS, 1911); published surficial geologic maps (Helley and Harwood, 1985); early and modern soil survey maps (Strahorn et al., 1911; Lytle, et al., 1988); field reconnaissance visit on June, 22, 2007, and other maps and documents (i.e., Chambers, 2002). Synthesis of these data allow for the development of a detailed surficial geologic map that provides an initial understanding of primary geomorphic processes that have acted in the study area during recent geologic and historical time. Through this mapping, primary geomorphic features and associated surficial geologic deposits are identified, such as abandoned paleochannels, marsh and basin deposits, and other features commonly associated with flood basins adjacent to large, active river systems.

The surficial geologic map was developed at the nominal scale of the aerial photography (1:20,000). This scale establishes the resolution of the map (Plate 1). The map unit contacts shown on the surficial geologic map should be considered approximate, and accurate to no more than about 30 feet on either side of the line shown on the map. The 1937 aerial photographs are the primary data set for interpreting the surficial geologic deposits because: (1) they are the oldest high-quality images available and pre-date much of the cultivation and landscape alteration within present-day Sutter County (Figure 2); and, (2) because these data represent a close approximation to the surficial deposits that were likely present at the ground surface prior to construction of the levees. The 1937 photographs generally were taken in later summer or early autumn (i.e., August). By 1937, the area had experienced moderate cultivation that locally obscures geomorphic conditions. However, integration of data from the 1937 photographs, old and recent topography, existing geologic maps, existing soil surveys and historical documents provides sufficient information to delineate many of the pre-historical and historical surficial deposits in detail. Taken together, these data provide key insights to the geomorphic processes and resulting deposits that may affect levee underseepage.

Additional floodplain deposition may have occurred after 1937, due to flood overflows, levee overtopping, or localized levee failure. A time series analysis that interprets successive aerial photographs taken after major flood events (i.e., 1955) or known local levee failures (i.e., 1986) may reveal additional information on surficial deposits in the Wadsworth Canal area. However, such analyses are beyond the scope of this project. The data and interpretations presented herein address the primary goal of characterizing the type and distribution of deposits likely present directly beneath the project levees.

1.1 Report Preparation Quality Control

The surficial geologic map data and geomorphic interpretations presented in this memorandum were subject to quality control and quality assurance procedures as required by the Levee Geotechnical Evaluation Project Management Plan (PMP). The surficial geologic map data developed by this study were reviewed for accuracy and completeness through an internal review and an independent technical review by Dr. Janet Sowers of WLA. Results of QA/QC



review were documented using PMP Exhibit 2.2-3 (Independent Technical Review Report) and are kept on file according filing control plan. Subsurface data shown on diagrams were provided as draft information, and were not verified for accuracy or completeness by this study.

2.0 Geologic Setting

The Wadsworth Canal (WC) study area is southeast of the Sutter Buttes, a presently in-active and dissected rhyolitic and andesitic volcanic neck, and between the Sacrametno River to the west and the Feather River to the east (Figure 1). The WC levee addressed in this study borders the southeastern side of Wadsworth Canal from just north of Butte House Road to the eastern Sutter Bypass levee. The WC levee trends northeast-southwest, and ties in to the eastern Sutter Bypass levee (Figure 1).

The WC levee lies northeast of Sutter Basin, a low-lying area east of the Sacramento River where overflow and floodwaters produce a seasonally marshy area. Except for the Sutter Buttes, the land regional surface is nearly flat, and along the WC area gently slopes southwest at an elevation of about 40 to 50 feet. Construction of the WC levee was completed by 1924, and was subsequently enlarged in 1942 (DWR, 1976). Prior to cultural modification, surface water runoff in the WC area was delivered to the Sutter Basin via intermittent, meandering creeks and sloughs from the northern Central Valley, including: Snake River, Snake Slough, Little Blue Creek, and ephemeral channels emanating from the eastern side of Sutter Buttes. Presently, many of the natural drainages and channels have been replaced by linear ditches, agricultural drains, and canals (Figure 2).

3.0 Surficial Geologic Mapping

Published surficial geologic maps within the WC study area generalized the surficial deposits primarily as Quaternary basin deposits, with localized units of Quaternary alluvium (map unit Qa) and Quaternary Modesto Formation (lower member, map unit Qml) (Helley and Harwood, 1985). These map units were delineated by Helley and Harwood (1985) at a regional scale (i.e., 1:62,500). The current analysis of the WC uses this existing geologic framework as a basis for more detailed mapping of late Holocene alluvium and geomorphic features (Plate 1). The surficial geologic map units in the Wadsworth Canal study area are described below, in order from oldest to youngest.

The oldest map unit exposed in the study area is the Pliocene-Pleistocene tuff breccia (map unit QTm). This rock primarily comprises a peripheral topographic ring around the relatively high relief Sutter Buttes, and consists of consolidated coarse material derived from the volcanic rocks of the Buttes. This bedrock is exposed in the northwest corner of the WC map area (plate 1).

The Quaternary Riverbank Formation (lower and upper members) is exposed at the ground surface adjacent to the tuff breccia (map unit Qrl and Qru, Plate 1). This map unit does not directly underlie the project levees in this study area, but is present in the shallow subsurface as



alluvial-fan deposits derived from the Sutter Buttes during the middle Pleistocene (about 400,000 to 200,000 years ago). The Riverbank Formation is semi-consolidated, and the top of the formation is marked by a hardpan (or, duripan) layer that is a product of soil-forming processes over substantial geologic time. This hardpan layer reflects an ancient land surface that is now buried by younger deposits. In WC area, the upper Riverbank formation is associated with the Sutter clay (Strahorn, et al., 1911), and Marcum clay loam with "siltstone" hardpan (Lytle, 1988).

The late Pleistocene Modesto Formation is exposed at the surface as alluvial-fan deposits emanating from southwestern Sutter Buttes, and is younger than, and inset into, the Riverbank Formation (Plate 1). This unit is divided into two members, a lower (older) unit that is about 42,000 to 29,000 years old (map unit Qml), and an upper member that is about 24,000 to 12,000 years old (map unit Qmu) (Helley and Harwood, 1985). The upper member in the map area is associated with sub-linear low ridges to the east of the WC that have not been completely covered by basin deposits. The Modesto Formation is locally associated with the Sutter sandy loam (Strahorn, et al., 1911), and the Olashes sandy loam (Lytle, et al., 1988); the sand consisting of volcanic lithologies indicating derivation from Sutter Buttes parent material. The latest Pleistocene Modesto Formation, in general, consists of unconsolidated sand, silt, and clay, and is associated with a moderate amount of secondary (pedogenic) clay accumulation that may form laterally continuous zones of low hydraulic conductivity.

Holocene deposits (less than 11,000 years old) in the WC map area consist of basin and alluvial deposits (Qb of Helley and Harwood [1985]; map unit Qn, Plate 1). These widespread basin deposits, about 4 to 8 feet thick, overlie the Modesto Formation. The soils developed on the basin deposits are generally the Gridley clay loam and Oswald clay (Stahorn et al., 1911; Lytle, et al., 1988), immature soils with fine-grained textures. Undifferentiated Quaternary alluvium (map unit Qa) is present near the western margin of the map area, deposited by pre-historic Butte Creek. Holocene alluvium is mapped at the surface as alluvial-fan deposits emanating from southwestern Sutter Buttes, and is younger than, and locally overlies the upper Modesto Formation. These deposits likely consist of poorly sorted mixtures of fine gravel, sand, and silt derived from the volcanic rocks of the Buttes. The Quaternary marsh deposits (map unit Qs, Plate 1) are present between the levees of the Sutter Bypass, and consist of fine grained deposits that are differentiated from basin deposits by generally being underwater or having standing water at the time when the 1937 photographs were taken.

Holocene alluvial channels (map unit Hch, Plate 1) are mapped as a network of moderately sinuous channels with southwesterly orientations. These channels appear to be mostly filled in with sediment on the 1937 photographs, and are not expressed as strong topographic lows in the ground surface. Many of these channels extend beyond, and therefore cross beneath, the eastern Sutter Bypass levee and WC levee (Plate 1). The infilling material in the basal portions of the channel consists of relatively loose, coarse material (i.e., sand), which fines upward into fine-grained, silt and clay. The channel deposits are tentatively associated with the Liveoak series, sandy clay loam soil (Lytle, et al., 1988).

Localized deposits related to the Holocene alluvial channels are in-stream bars (map unit Hb) that typically occur in the medial portions of the channels, and distributary fans (map unit Hdf)



that occur where the channel morphology tapers out and the channel has deposited sediment on the basin floor. These two types of deposits are uncommon in the study area, and have been mapped only distant from the WC levee.

Historical alluvial channels (map unit Rch, Plate 1) also are mapped as a network of moderately sinuous channels that have southwesterly orientations toward Sutter Basin. The term "historical" is applied to deposits that are estimated to be less than 150 years old. The historical channels are differentiated from the slightly older Holocene channels on the basis of crosscutting relationships, relative degree of geomorphic expression, and correlation with mapped creek positions on the 1911 USGS topographic map. The Wadsworth Canal levee overlies the former locations of these alluvial channels in several locations throughout its length (Plate 1).

4.0 Conceptual Geomorphic Model

Based on synthesis of surficial geologic mapping, early topographic maps, soil surveys, geologic maps, and review of readily available subsurface geotechnical information, this section presents a preliminary conceptual model describing general relationships among surface and subsurface deposits in the Wadsworth Canal area. This conceptual model provides a consistent basis for understanding the type and distribution of surficial geologic deposits, primary geomorphic processes, and shallow subsurface stratigraphy in the area.

The geologic deposits present at the surface and in the shallow subsurface are derived from three general source areas: (1) material eroded from the Sutter Buttes and transported to the adjacent low-lying basin floor forming modest alluvial fans (i.e. Riverbank and Modesto Formations); (2) material deposited on the basin floor as fine silt and clay settled from standing or slow moving floodwaters of large rivers (i.e., basin deposits); and, (3) material transported to the basin by the ephemeral creeks and sloughs that traversed the valley floor prior to present day modification (i.e., channel fill).

The WC project levee trends southwest, and is primarily underlain by clayey basin deposits with some silt and sand (Plate 1, Figure 3). The basin deposits rest directly on the upper Modesto Formation, the upper boundary of which is characterized by a clay hardpan horizon associated with a buried soil. The hard pan layer is generally observed as a very stiff to hard, lean to fat clay, 10YR ³/₄ colors (Munsell color notation) associated with locally increased density (i.e., blow counts, CPT tip resistance), and likely very low permeability. Thus, the upper Modesto Formation mapped in northwest potion of the map area extends below ground, and dips southeasterly beneath the project levee in the shallow subsurface.

Fine-grained basin deposits overlie the upper Modesto Formation near the WC levees (Figure 3). These deposits accumulated on the valley floor over geologic time resulting from flooding of the major rivers (i.e., Sacramento and/or Feather Rivers), tributaries draining Sutter Buttes, and sheetwash from the generally flat valley floor. This resulted in inundation of the basin with standing water, and subsequent settlement of silt and clay from suspension. The thickness of the basin deposits is about 4 to 8 feet, but locally may be thicker. Review of available Phase 1 and other existing geotechnical data (i.e., Chambers 2002) indicate medium stiff to very stiff



relative density of the basin deposits. However, there is a substantial lateral and vertical variability in the hardness properties of the basin deposits.

Laterally cross-cutting, and vertically inset into the basin deposits, are the Holocene and Historical channel deposits (map units Hch and Rch, Plate 1). These southwest-trending alluvial channel deposits locally underlie the WC levee, and thus result in local differences in material textures beneath the levee (Figure 3). Field reconnaissance on June 22, 2007 reveals that the topographic expression of these channels has been obliterated by cultivation. However, sub-linear to curvilinear differences in ground color (i.e., darker strips) were observed in the cultivated fields in areas that potentially correlate with mapped channels, suggesting a contrast in materials in the shallow subsurface. Review of subsurface geotechnical data indicate that the channel fill deposits include a lower channel fill consisting of relatively loose, coarser material (i.e., sand), fining upward and grading into fine-grained silt and clay. Many of these channels extend across, and therefore continue beneath, the WC levees (Plate 1, Figure 3).

Figure 3 illustrates the relationships between the surficial channels, basin deposits, and shallow stratigraphy that underlie the WC project levee, wherein dense, semi-consolidated Pleistocene deposits are overlain by a layer of fine-grained basin deposits, locally cut by alluvial channel deposits.

5.0 Applications to the Urban Levee Project

Based on synthesis of the surficial geologic map with preliminary Phase 1 boring and cone penetrometer (CPT) data, and historical geotechnical subsurface exploration data (i.e., Chambers, 2002), the WC levee is underlain by relatively young fine-grained clay and sandy clay deposits that are laterally interrupted by local coarser channel fill deposits (Figure 3). Mud rotary borehole WSEWWC-002B penetrates a mapped surficial channel unit (Figure 3, Plate 1), and indicates the channel fill is silty sand that grades upward into clay, with an uncorrected SPT blow count of 5 blows per foot. This suggests locally loose and unconsolidated, and therefore likely permeable, material in the shallow subsurface. Initial review of subsurface boring profiles completed along the eastern landside of the Wadsworth Canal near the tie-in to the Sutter Bypass levee (Chambers, 2002) also shows relatively loose and soft sandy deposits (i.e., blow counts of 0 to 5) that are overlain by a layer of medium stiff clay-rich material.

Synthesis of the surficial mapping and geotechnical data indicate that subsurface stratigraphy the WC area locally may be conducive to levee underseepage. Shallow strata typically include denser and probably semi-cemented material (i.e., Modesto Formation) that likely contains a low-permeability hardpan horizon. The hardpan may or may not be laterally continuous, depending on post-depositional soil formation and erosional processes. The Modesto formation is overlain by about 4 to 6 feet of medium stiff to stiff clay (i.e., basin deposits). Surficial mapping indicates that the basin materials locally are cross-cut by relatively loose, sandy channel deposits; subsurface geotechnical data show lateral and vertical variations in texture and density that are probably related to buried channel deposits. Therefore, this shallow subsurface stratigraphy may promote levee underseepage along certain areas of the WC project



levees where geologically young, loose, sandy channel material lies between the dense Pleistocene deposits and relatively stiff, low-permeability clay-rich surface "blanket" layer.

Lateral and vertical variability in the shallow subsurface deposits has resulted from past geomorphic processes. The conceptual subsurface stratigraphic framework suggests that stratigraphic relationships may promote localized levee underseepage, given certain hydraulic conditions. Further spatial analyses of the surficial geologic mapping and subsurface geotechnical exploration data are needed to better constrain and characterize areas that are most susceptible to underseepage in the study area.

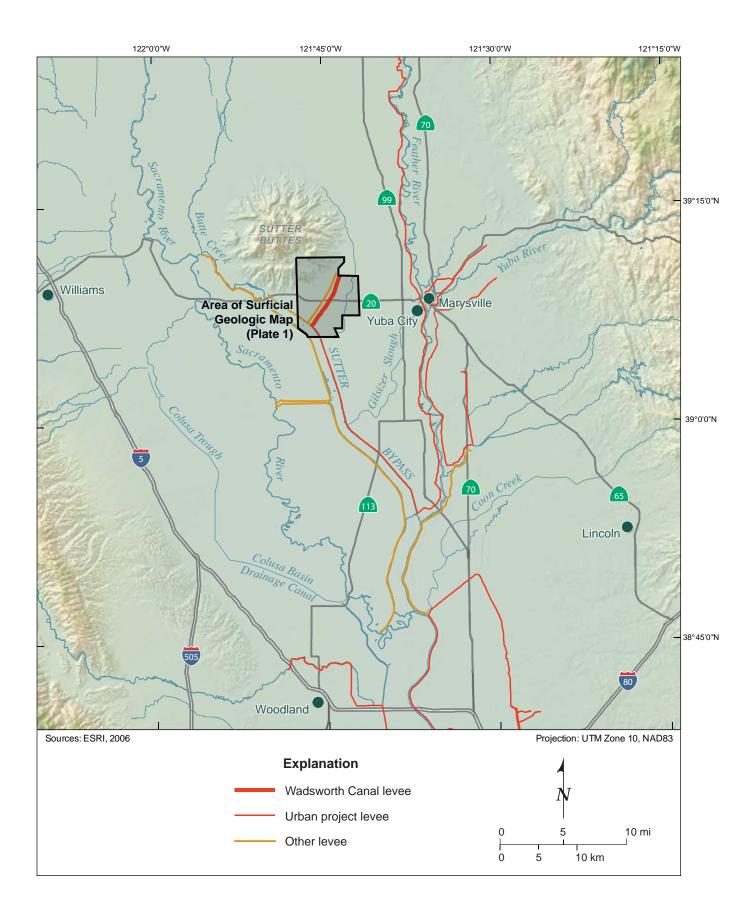
6.0 Limitations

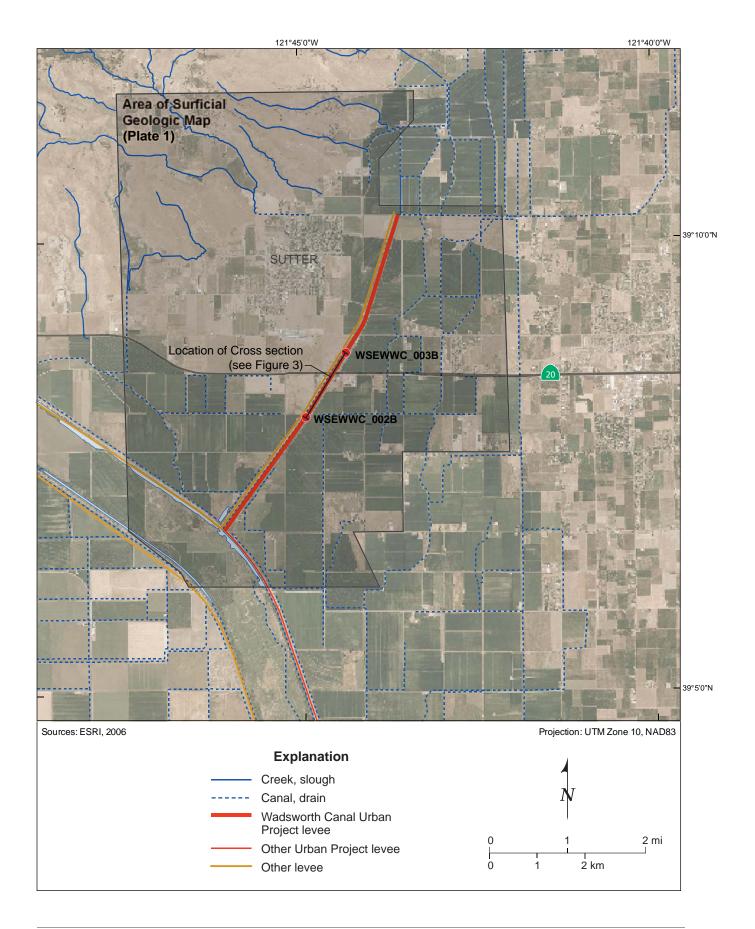
This geomorphic assessment and associated data interpretation have been performed in accordance with the standard of care commonly used as the state-of-practice in the geologic engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this geographic area performing the same services under similar circumstances during the same time period.

Discussions of surface and subsurface conditions summarized in this technical memorandum are based on geologic interpretations of subsurface soil data at limited exploration locations available to this assessment through July of 2007. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions in the levee and its foundation. This memorandum is for the use and benefit of DWR. Use by any other party is at their own discretion and risk.

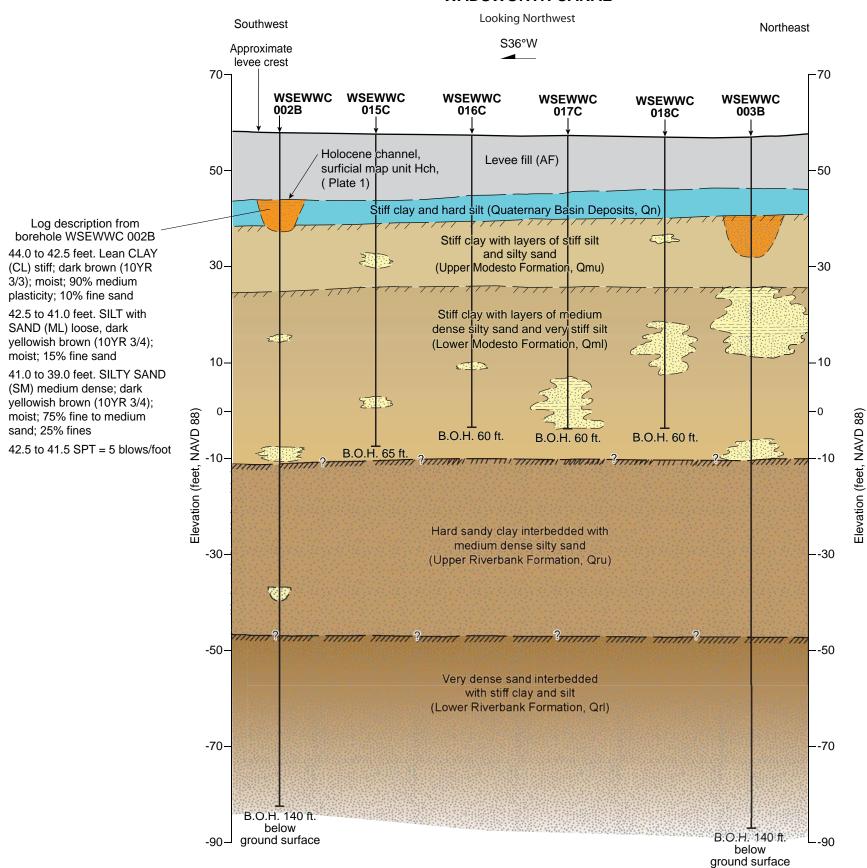
7.0 References

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- Strahorn, A.T., Mackie, W.W., Holmes, L.C., Westover, H.L., Van Duyne, C., 1911, Soil Survey of the Marysville Area, California; 1:62,500, USDA Bureau of Soils
- USGS, Sutter topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.





WADSWORTH CANAL



Explanation



Channel identified on surficial geologic map or as fining upward sequence of sediments in boreholes



Localized sand and gravel; possible channel; interpreted from suburface borehole data

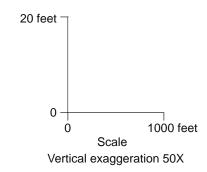


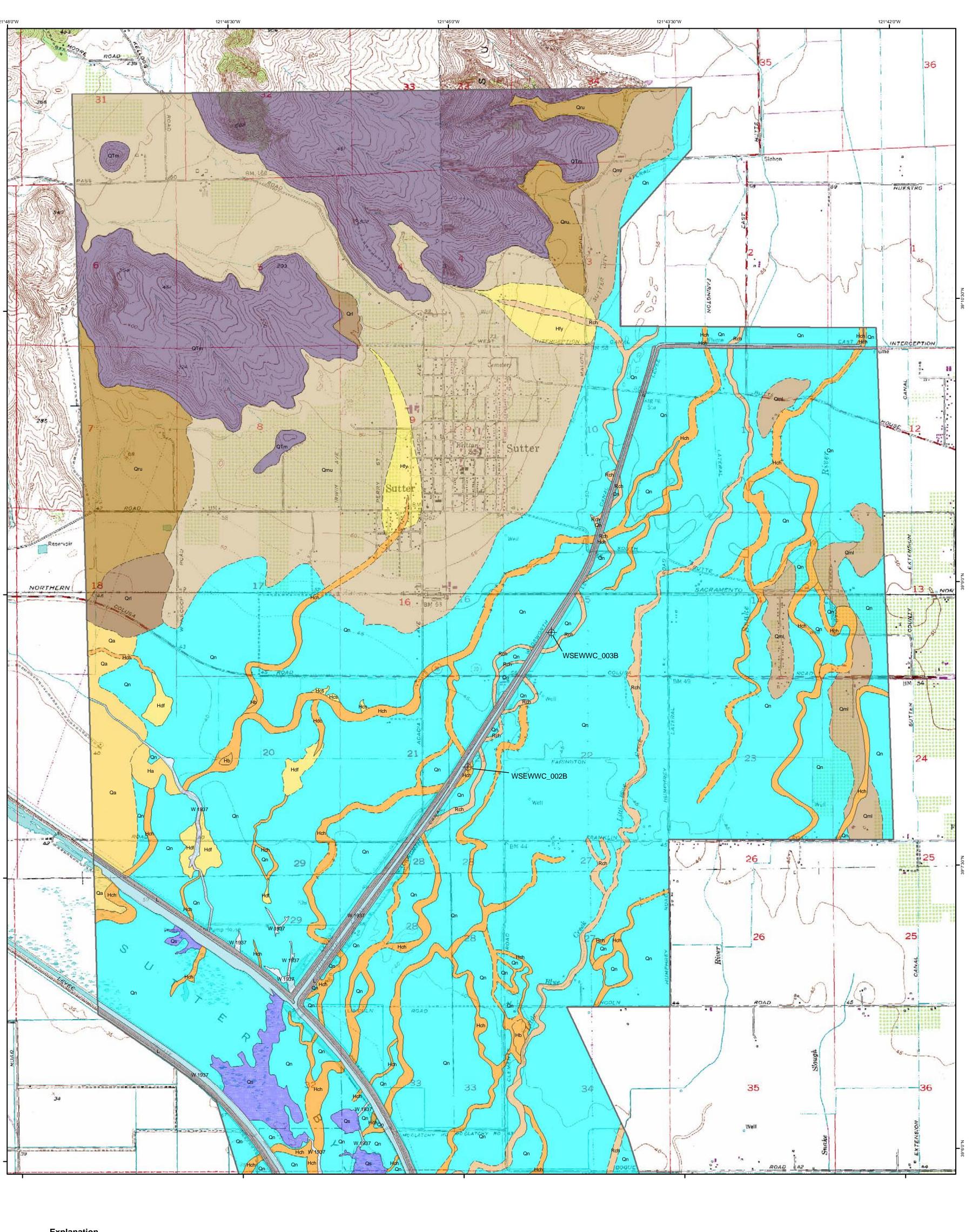
Moderate paleosol (hardpan)



////// Strong paleosol (hardpan)

- Notes: 1. Borehole ground elevation values from Engeo, Inc. draft borehole logs as estimated from map (NAVD 88). Absolute elevations of geologic contacts could change if reported ground elevations of boreholes are revised.
 - 2. CPT borehole surface elevations are approximate. placed on projected ground surface between continuous boreholes WSEWWC-002B and 003B.
 - 3. All depths (vertical axis) shown as elevation values (NAVD88), as shown on Engeo, Inc. borehole logs.
 - 4. Bottom of hole (B.O.H.) values shown as total depth below ground surface.
 - 5. Borehole names and and horizontal distance shown above (from Engeo logs and location maps). Geologic relations could change if borehole locations are
 - 6. Drilling method indicated as last letter in borehole
 - B = Mud Rotary borehole with SPT
 - C = Cone Penetrometer Test
 - 7. See Figure 2 for location of cross section.





Explanation

Geologic contact; dashed where approximate, dotted where concealed, queried where uncertain; solid contacts have a resolution no better than about 30'. WSEWWC_003B +

Geotechnical borehole, approximately located.

W Water visible on 1937 aerial photography.

Geologic Units

Hdf

На

Qn

Qs

HOLOCENE

HISTORICAL AF Artificial fill; visible on 1937 aerial photography.

Rch Channel deposits; sorted sands and silty sand; fining upward.

Hcs Crevasse splay deposits; fine to coarse sand, silt and clay. Hdc Distributary channels, sand, silt, and clay.

Distributary fan deposits; sand, silt and clay.

Hch Channel deposits; sorted sands and silts; fining upward. Hb Channel bar deposits; fine sand, and silt deposited in or along channel lateral margins.

Hfy Alluvial fan deposits, well graded gravel, sand, silt and clay; volcanic lithologies. Qa Alluvial deposits, undifferentiated; sand, silt, and minor lenses of gravel; under cultivation in 1937.

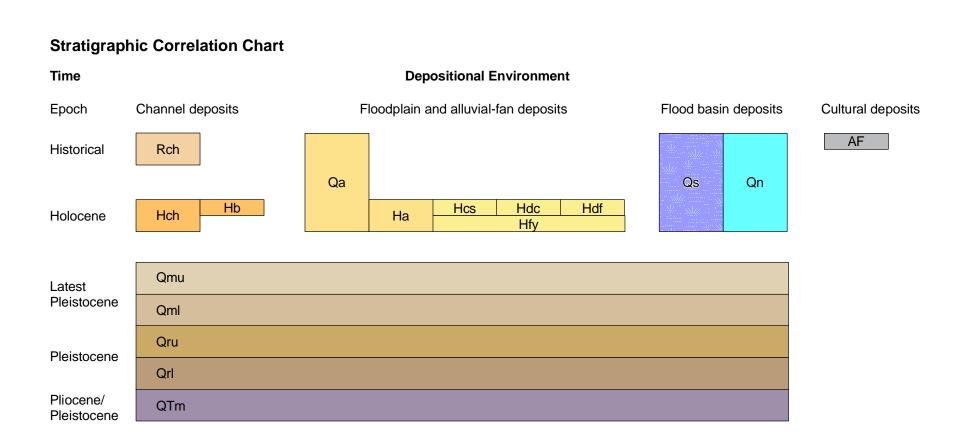
Basin deposits; fine sand, silt and clay, dark yellow to dark yellowish brown, under cultivation in 1937. Marsh deposits; silt and clay, likely organic-rich; perennially or seasonally submerged on 1937 photography.

Alluvial deposits; undifferentiated; sand, silt, and minor lenses of gravel; under cultivation in 1937.

Qmu Modesto Formation; upper member; unconsolidated to semi-consolidated gravel, sand, silt, and clay. PLEISTOCENE Qml Modesto Formation; lower member; unconsolidated gravel, sand, silt and clay.

Qru Riverbank Formation; upper member, semi-consolidated to consolidated gravel, sand, silt and minor clay. Qrl Riverbank Formation; lower member; consolidated gravel, sand, silt, and clay, generally associated with strong duripan horizon.

PLIOCENE / PLEISTOCENE QTm Tuff Breccia; Volcanic tuff breccia (andesitic and rhyolitic) from Sutter Buttes, latest Pliocene.



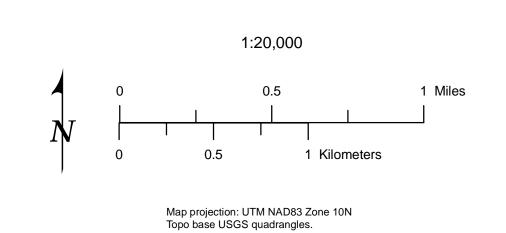


Plate 1 - Surficial Geologic Map

of the Wadsworth Canal Area WILLIAM LETTIS & ASSOCIATES, INC. Walnut Creek, CA

Sutter_MGT_Plate1_Wadsworth.mxd

09/04/2009

URS Supplemental Geotechnical Data Report (2010), Appendix O, Volume 3





1777 Botelho Drive, Suite 262, Walnut Creek, California 94596 tel (925) 256-6070 fax (925) 256-6076

September 8, 2009

Mr. Juan Vargas URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento, CA 95833

RE: Surficial geologic mapping and geomorphic assessment, California Department of Water Resources Urban Levees Project, Southern Feather River, Sutter County, California

Dear Mr. Vargas:

This memorandum presents the surficial geologic mapping and preliminary geomorphic assessment of the southern Feather River study area, for the California Department of Water Resources (DWR) Urban Levees Project geotechnical characterization. The goal of this mapping and geomorphic assessment is to provide information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees along the western bank of the Feather River. The purpose of this study is to develop spatially-continuous geologic data and a conceptual model that provides a framework for stratigraphic interpretations between widely-spaced subsurface explorations. A primary goal is to provide a geologic framework for the geotechnical assessment of potential levee underseepage. This memo presents the technical approach, surficial geologic map, conceptual geomorphic model, and initial results based on map analysis and preliminary review of Phase 1 geotechnical data.

We appreciated the opportunity to provide these geomorphic and geologic data and preliminary interpretations of the shallow stratigraphic conditions in the southern Feather River study area. Please do not hesitate to call either of the undersigned if there are any questions or comments.

Respectfully,

WILLIAM LETTIS & ASSOCIATES, INC.

Justin Pearce, C.E.G. 2421

Senior Geologist

Ashley Streig

Senior Staff Geologist

Appley R. Streety

Keith Kelson, C.E.G. 1610

Will Kelson

Principal Geologist



1.0 Approach

The approach to developing a surficial geologic map of the southern Feather River project area (Figure 1, Plate 1) consisted of analysis of the following data: Aerial photography (black and white stereo-pairs taken in 1937, ~1:20,000-scale); early USGS topographic maps (i.e., 1911); published surficial geologic maps (Helley and Harwood, 1985); early and modern soil survey maps (Strahorn et al., 1909; Lytle, et al., 1988); and other maps and documents (Busacca et al., 1989). Synthesis of these data allow for the development of a detailed surficial geologic map that provides an initial understanding of primary geomorphic processes that have acted in the study area during recent and historical geologic time. Through this mapping, primary geomorphic features and associated surficial geologic deposits are identified, such as abandoned paleochannels, channel deposits, floodplain deposits, basin deposits and other features commonly associated with surficial deposits with large active river systems. Knowledge of fluvial processes and the ability to recognize depositional environments in the geologic record are key to identifying locations along levees where underseepage is most likely to occur (Llopis et al., 2007).

The surficial geologic map was developed at the nominal scale of the aerial photography (1:20,000). This scale establishes the resolution of the map (Plate 1), such that analysis of the map data at a more detailed scale than 1:20,000 may introduce uncertainties beyond the original resolution of the data. The map unit boundaries shown on the surficial geologic map should be considered approximate, and accurate within 30 feet on either side of the line shown on the map. The 1937 aerial photographs are the primary data set for interpreting the surficial geologic deposits because: (1) they are the oldest high-quality images that pre-date much of the urbanization and landscape alteration within present-day Sutter County (i.e. Figure 2); and, (2) these data represent a close approximation to the surficial deposits that were likely present at the ground surface prior to the construction of the levees. The 1937 photographs generally were taken in late summer or early autumn (i.e., August). By 1937, the area had experienced moderate cultivation that locally obscures geomorphic conditions. However, integration of data from the 1937 photography, old and recent topographic maps, geologic maps, soil surveys and historical documents provides sufficient information to delineate many of the pre-historical and historical surficial deposits in detail. Taken together, these data provide key insights to the characteristics of shallow deposits beneath the levees, as well as the geomorphic processes responsible for their distribution.

Additional floodplain deposition may have occurred after 1937, due to flood overflows, levee overtopping, or localized levee failure. A time series analysis that interprets successive aerial photographs taken after major flood events (i.e., USDA, black and white stereo-pairs taken in 1958, ~1:20,000-scale) or known local levee failures (i.e., 1986) may reveal additional information on surficial deposits in the southern Feather River area. Such analyses are beyond the scope of this study. The data and interpretations presented herein address the primary goal of characterizing the type and distribution of deposits likely present directly beneath the project levees.



1.1 Report Preparation Quality Control

The surficial geologic map data and geomorphic interpretations presented in this memorandum were subject to quality control and quality assurance procedures as required by the Levee Geotechnical Evaluation Project Management Plan (PMP). The surficial geologic map data developed by this study were reviewed for accuracy and completeness through an internal review and an independent technical review by Dr. Janet Sowers of WLA. Results of QA/QC review were documented using PMP Exhibit 2.2-3 (Independent Technical Review Report) and are kept on file according filing control plan. Subsurface data shown on diagrams were provided as draft information, and were not verified for accuracy or completeness by this study.

2.0 Geologic Setting

The southern Feather River study area lies in the Central Sacramento Valley, between the Coast Ranges to the west and the Sierra Nevada foothills to the east. Feather River drains the western slope of the Sierra Nevada, and emerges from the mountains south of the Thermalito Afterbay (Figure 1). The river flows southward from the Thermalito Afterbay, over middle-to late Pleistocene dissected alluvium derived from the Sierra Nevada. The regional land surface is nearly flat, with a gentle west-southwest slope that flattens out south of the Sutter Buttes, in Sutter Basin. The Feather River is entrenched into middle to late Pleistocene semi-consolidated sediments. Holocene alluvium deposited by the Feather River is present between the present-day levees, inset to the older formations, as well as on the western floodplain as subdued natural levees. The river trends roughly south until its confluence with the Bear River, where it curves

to the southwest (Figure 1). The Feather River lies east of, and is a tributary to the Sacramento River, converging near the town of Nicolaus (Figure 1). A primary influence on the historic processes in the river system was the hydraulic mining that began in the 1850's. Mining occurred through the early 1900's in the Feather, Yuba and Bear River watersheds, and abruptly introduced large quantities of sediment, drastically changing the geomorphic characteristics of these river systems (DWR, 2004; Ellis, 1939). Aggradation within the stream channel was a primary response to the introduction of substantial mining debris (James, 1999), consequently young alluvial deposits are common throughout the study area.

3.0 Surficial Geologic Mapping

Previous geologic mapping in the study area along the Feather River and surrounding areas generalize the surficial deposits as: Quaternary Alluvium (Qa) and Quaternary stream channel deposits (Qsc) within and proximal to the modern Feather River channel, (Helley and Harwood, 1985). These map units are considered Holocene age (less than 11,000 years old). Late Quaternary Modesto Formation (Qmu, Qml) is mapped along the western margin of the floodplain. These map units were delineated by Helley and Harwood (1985) at a regional scale (i.e., 1:62,500). The current analysis of the Feather River uses this geologic framework as a basis for more detailed mapping of late Holocene alluvium and geomorphic features (Plate 1).



The surficial geologic map units within the southern Feather River study area are described below, in order from oldest to youngest. Surficial geologic mapping for this study subdivides these map units and delineates individual deposits based on relative age and depositional process or environment (Plate 1). The map units depicted on Plate 1 are based primarily on analysis of 1937-vintage photography, and thus the map essentially is a "snapshot" of geologic conditions at this time.

The oldest unit exposed along the Feather River is the lower member of the Riverbank Formation (Qrl) of Helley and Harwood (1985). This unit is a highly dissected alluvial surface with textures of weathered gravel, sand and silt with strong soil-profile development. The Riverbank Formation is semi-consolidated, and is associated with the presence of a well-developed hardpan (or, duripan) layer that is a product of soil-forming processes over substantial geologic time. This hardpan layer reflects an ancient land surface that locally is buried by younger deposits. The Riverbank Formation is late to middle Pleistocene in age, and is estimated to be 130,000 to 450,000 yrs old (Helley and Harwood, 1985). The upper member is unconsolidated dark brown to red alluvium consisting of gravel, sand, silt and minor clay (Busacca et al., 1989, Helley and Harwood, 1985).

The Modesto Formation is divided into two members, a lower (older) unit that is latest Pleistocene in age (about 29,000 to 49,000 years old), and consists of unconsolidated slightly weathered gravel, sand, silt and clay. The upper member, a younger unit, is latest Pleistocene age (circa 12,000 to 26,000 years old) (Helley and Harwood, 1985). This unit (Qmu) is composed of sand, silt, and some gravel, comprising river channel and floodplain deposits, and is associated with a moderate amount of secondary (pedogenic) clay accumulation. This clay-rich horizon may form laterally continuous zones of low hydraulic conductivity, and may extend across boundaries between coarse and fine-grained strata within the latest Pleistocene alluvium. Soils on the Modesto Formation deposits include the Gridley loam of Strahorn et al. (1909) and the Conejo complex of Lytle et al. (1988).

Latest Holocene deposits overlie or are inset into the Modesto Formation, and are categorized as channel, floodplain, and basin deposits (Plate 1). Channel deposits include Holocene channels (Hch), distributary channels (Hdc), overflow channels (Hofc), sloughs (Hsl), instream or lateral bars (Hb), and meander scrolls (Hms). These deposits likely consist of fine to coarse sand, silty sand, and clayey sand, with trace fine gravel. Holocene channel deposits (Hch), which are present along Gilsizer Slough and the western floodplain as secondary channels, contain fining-upward sequences of sand, silt and clay. Overflow channels (Hofc) transport water across the land surface during high flow stages toward Sutter Basin. Networks of sloughs wander across the distal floodplain, and are likely filled with a fining-upward sequence of silt and clay (map unit Hsl). These deposits are associated with former channels, and generally are present landside (outboard) of the present-day human-made levees.

Holocene floodplain deposits include crevasse splays (Hcs), distributary fans (Hdf), and overbank deposits (Hob). Crevasse splays (Hcs) are sandy deposits that form from breaching of river banks or natural levees. Distributary fan deposits (Hdf) occur when water and velocity within a distributary channel decreases, can no longer transport its sediment load, and sediment is laid down on the floodplain. Overbank sediments are formed by localized overtopping of



river banks or natural levees, subsequent deposition from shallow sheet flow or standing water. Basin deposits occur on the distal floodplain and include undifferentiated basin deposits (Qn), and marsh deposits (Qs). Basin and marsh deposits are present in the topographically low areas west of the present-day natural levees along the Feather River. These deposits consist of fine sand, silt, and clay laid down in a relatively low-energy depositional environment. Soils developed on these deposits are the Sacramento series silt loam, fine sandy loam, clay, Alamo clay loam adobe and Stockton clay adobe. Marsh deposits are generally saturated and are often underwater in the present-day environment. Undifferentiated Holocene and Quaternary alluvium (Ha and Qa, respectively) usually are proximal to the river channel, and this map unit is used in areas where geomorphic features are obscured or obliterated by historical (1937-era) agriculture or cultivation. The deposits within these agriculturally modified areas are assigned a relative age (Ha or Qa) based on overlapping and cross cutting relationships with the surrounding deposits as follows: Ha if the agriculture-modified area is mapped within or shown overlying Holocene deposits; or Qa where it is difficult to evaluate the surface age based on the nearby deposits. Soils associated with these, undifferentiated units (Qa) are the Sacramento silt loam and Sacramento fine sandy loam, (Strahorn et al., 1909), and the Columbia fine sandy loam of Lyle et al. (1988), which are weakly developed soils commonly developed on relatively young deposits.

Historical deposits mapped in the area include stream channel and floodplain deposits, as well as artificial fill deposits (L and SP) (Plate 1). Historical deposits are estimated to be less than 150 years old, dating from approximately 1800 to 1937. Historical stream channels (Rch), distributary channels (Rdc), and overflow channels (Rofc) within the floodplain are recently abandoned channels or reflect active channels with low water flow. Lateral bar deposits (Rb) and meander scrolls (Rms) are located adjacent to the present-day Feather River, and are generally present inboard (waterside) of the present-day Feather River levees. When the river overtops its banks, distributary channels (Rdc) and recent overflow channels (Rofc) transport water and sediment across the floodplain. These channel deposits likely consist of silt and sand with traces of gravel. The upper few feet of these deposits probably are filled with debris from upstream hydraulic mining activities. Historical sloughs transport low velocity water flow derived from distributary channels proximal to the Feather River onto the distal floodplain and into the Sutter Basin. Slough deposits (Rsl) likely consist of fining-upward silt and clay.

Historical flood plain deposits include crevasse splay (Rcs), distributary fan (Rdf), and overbank (Rob) deposits, which generally consist of a fining upward or episodic fining upward sequence of sand, silt, and clay. Historical overbank (Rob) deposits are slightly finer grained sand, silt, and clay deposited via sheet flow when the river is at flood-stage and overtops natural and artificial levees. These historical deposits are differentiated based on cross-cutting and superposition relationships relative to existing cultural deposits visible on the 1937 photographs. Historical alluvial deposits (Ra), generally located within the Feather River channel, consist of undifferentiated sand, silt, and minor lenses of gravel. Historical artificial fills (map units L and SP) are culturally-emplaced heterogeneous deposits, with varying amounts of clay, silt, sand, and gravel from local sources. These deposits include levee structures and canal levee systems (L), and some undifferentiated soil piles (SP), and are shown on the surficial geologic map where present and identifiable on the 1937 photography.



Mapping of historical and Holocene deposits shown on Plate 1 generally is consistent with early, less-detailed soil survey mapping along the western banks of the Feather River as areas of Gridley loam, Sacramento Series fine sand, sandy loam and silt loam soils (Strahorn et al., 1909). The Gridley loam occurs along the northern Feather River from Thermalito south to the confluence with the Bear River, and closely corresponds to the Modesto Formation of Helley and Harwood (1985). The relationship between the mapped surficial geologic units and the potential for underseepage is summarized below.

4.0 Geomorphic Conceptual Model

The preliminary conceptual model described here is based on general relationships among surface and subsurface geologic deposits along the Feather River, as described above and shown on Plate 1. This conceptual model provides a consistent basis for understanding the type and stratigraphy in the area.

Published geologic maps of the project area identify a complex series of westward aggrading alluvial fans and terraces derived from the Sierra Nevada, identified as the Riverbank and Modesto formations. The Riverbank Formation and Modesto Formation are semi-consolidated to unconsolidated deposits characterized by intraformational paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. The Riverbank Formation unconformably overlies the Laguna Formation, which is a deeply dissected alluvial surface (Busacca et al., 1989).

Subsurface deposits about 150 feet beneath the ground surface rest on a resistant volcanic tuff capped by interbedded alluvial gravel, sand and silt, interpreted as Pliocene-Pleistocene age Laguna Formation that represents a period of relatively stable landscape conditions (Helley and Harwood, 1985). The Laguna Formation is overlain by the Pleistocene Riverbank Formation, (very dense gravel deposits) that are, in turn, overlain by a medium dense sand and gravelly sand package of the latest Pleistocene Modesto Formation (Busacca et al., 1989). The upper member of the Modesto Formation is exposed at the ground surface adjacent to the western bank of the Feather River south of Marysville and Yuba City. The Modesto Formation is mantled by unconsolidated deposits of Holocene age that comprise most of the surficial geologic deposits along the western side of the Feather River (Plate 1).

Geomorphic evidence suggests that the Feather River system south of Yuba City may have been located west of its present course (Figure 3). The present-day Gilsizer Slough diverges from the modern Feather River directly north of Yuba City and trends southwestward toward the Sacramento River. Alluvial deposits of Gilsizer Slough are inset (i.e. incised) into the Modesto Formation from Yuba City southward. The ancestral Gilsizer Slough perhaps extended to as far as the Sacramento River (Figure 3), based on surficial mapping not included in this report, and inspection of topographic maps. The ancestral Gilsizer Slough deposits are related to discharges and sediment loads that were higher than present-day conditions, and perhaps is an ancestral course of the Feather River.



Surficial geologic deposits near the Yuba City airport indicate the Feather River occupied an intermediate position between ancestral and present locations. The river occupied an abandoned channel arm north of Shanghai Bend, located between Gilsizer Slough and the modern Feather River (Figure 3). From this point the river continued southward in nearly its present location. This paleochannel had a sharp, more exaggerated bend than the present-day channel at Shanghai Bend (Figure 2). The channel subsequently moved eastward, laterally backfilling and abandoning the meander above Shanghai Bend, and moved to the rivers' present location closer to Marysville. Today, Gilsizer Slough is a natural bypass for high water flow stages on the Feather River, in the area between Marysville and Yuba City (Ellis, 1939).

Surficial geologic mapping (Plate 1) shows differences in deposit type and distribution from north to south along the Feather River, which is associated with changes in watershed production of water and sediment, related geomorphic processes, soil profile development, and the underlying subsurface hardpan layer. These differences illustrate the diversity of past geomorphic processes along the river and, as a consequence, the type of geologic deposits at and near the ground surface. The surficial geologic map allows the delineation of reaches along the river within which geomorphic processes and their associated deposits appear to be relatively consistent.

Between Yuba City on the north to the confluence with the Sutter Bypass on the south, the southern Feather River consists of four major reaches, each having characteristic deposit types and distributions. The river reaches are numbered Southern Feather one through four (SF-I through SF-IV), sequentially from north to south (Plate 1, Figure 3). This report describes the surficial geologic characteristics of Reach SF-I, SF-II, SF-III and SF-IV of the southern part of the Feather River, extending from Yuba City, south to the confluence with the Sutter Bypass.

Reach SF-I, extends from the north end of Yuba City to the Yuba City airport, and is about 1.15 miles long (Plate 1, Figure 3). The Project levee along Reach SF-I trends roughly north-south, and overlies alluvial sediments deposited by the Feather River. In Yuba City the levee rests on Holocene deposits associated with Gilsizer Slough that are inset into the upper member of the Modesto Formation. The active Feather River channel is east of, and inset to these Holocene channel deposits (Figure 4).

The second reach of south Feather River project area, SF-II, extends from the Yuba City airport south to Shanghai Bend, and is about 2.9 miles long. Near the Yuba City airport, and south of the confluence of the Feather and Yuba Rivers, young channel deposits are inset against the Gilsizer Slough channel deposits (Plate 1). From the Yuba City airport, south to Epley Drive (about 1.5 miles), the levees overlie historical alluvium of mining debris origin, map unit Ra. From Epley Drive south to Shanghai Bend Road the levees (about 1.4 miles) overlie historical meander scrolls, map unit Rms, (Figure 2, Plate 1). The levee along this reach, SF-II, primarily overlies Holocene channel fill, historical alluvium and overbank deposits. These channels are likely filled with a fining-upward sequence of gravel, sand and silt, the upper few feet of these features are probably covered by a veneer of sediment derived from upstream hydraulic mining activities (Figure 4).



River Reach SF-III extends from Shanghai Bend on the north to just south of the confluence with Bear River, and is approximately 12 miles long (Plate 1). Along Reach SF-III, the active river floodplain is inset into the upper member of the Modesto Formation. Over geologic time, flooding has lead to the vertical accretion of overbank and crevasse splay deposits onto the Modesto Formation west of the Feather River. Overflow channels and related deposits (Rofc) are common along this reach of the river. Beginning at Shanghai Bend and continuing southward are seven overflow channels that range from approximately 100 to 200 feet wide. The Project levees overlie these channels in the area around Messick Road (Plate 1). A few overflow channels conduct water flow immediately landside of the levees, across a short distance between Shanghai Bend and Oswald Avenue, then converge with the Feather River. The overflow channels are slightly inset to the Modesto Formation, and based on borehole data from locations where these channels cross the Sutter Bypass, are probably 6 to 15 feet deep. These channels are likely filled with episodic fining upward sequences of silt, sand and gravel, representing multiple flood events on the Feather River. The upper few feet of these channels are probably filled with sediment from upstream historic hydraulic mining activities. The river channel widens considerably between Country Club Road (0.5 mile width) and Obanion Road (1 mile width), (Plate 1). Feather River meanders along the eastern edge of Abbott Lake, swings sharply southward into Star Bend, where the river is deflected eastward by a resistant knob of Modesto Formation (which forms Star Bend). Historical crevasse splay and overbank deposits overlie the Modesto Formation from Abbott Road to Star Bend Road, along the western edge of Abbot Lake (Figure 5). These crevasse splay deposits are likely filled with a fining-upward sequence of fine gravel, sand and silt, The upper few feet of these features are probably covered by a veneer of hydraulic mining sediment.

The southernmost reach, Reach SF-IV, extends from the area south of the confluence with the Bear River to the confluence of the Feather River and Sutter Bypass, and is roughly 4 miles long (Plate 1). The sediments underlying the levee along this reach are geomorphically complex, resulting from depositional convergence between the Feather River and Bear River. The Bear River channel deposits large amounts of sediment across the ground surface adjacent to the confluence. The Modesto and Riverbank Formations are exposed at the ground surface adjacent to natural levees immediately north of the Bear River confluence, and north of this reach (Plate 1). These formations are covered by historical alluvium, sourced from the Feather and Bear Rivers. Much of the historical activity along this reach is located near the levee at Laurel Avenue. Here, consisting eight distributary channels (Rdc), typically 90 feet wide but ranging from 45 to 190 feet wide, cross the floodplain in southwesterly orientations, terminating in geologically young distributary-fan sediments. These sediments, primarily consisting of fine to coarse sand and silt, probably were deposited as a result of increased sediment and water input contributed to the Feather River from the Bear River. Historically, the Feather River and the Bear River have aggraded from substantial mining debris input, thus reducing channel cross sectional area (i.e., James, 1999). This reduction of cross section area, coupled with the trajectory of flood flow from the Bear River watershed, resulted in water overtopping the Feather River channel banks, and depositing sediment onto the floodplain between the confluence of the Feather River and Sutter Bypass (Plate 1).



5.0 Applications to the Urban Levee Project

Based on an initial analysis of surface geologic and geomorphic data, the levees bordering the western side of the Feather River from Yuba City to the Sutter Bypass, (Reaches SF-I, SF-II, SFIII and SF-IV) probably are underlain by a veneer of near-surface sandy deposits, or by buried channels that are inset into the Modesto Formation. The preliminary conceptual surface and subsurface geologic relationships as they relate to levee structures and potential underseepage along each reach of the river are described below. This study does not account for any existing seepage mitigation structures, i.e. slurry wall or cutoff wall, which may be present.

Reach SF-I contains the Gilsizer paleochannel deposits, this channel intersects the levees roughly 660 feet south of Lynn Way to Colusa Avenue (Plate 1). Along this length the levees are underlain by coarse channel deposits. These coarse grain deposits are likely laterally continuous and poorly consolidated and relatively highly permeable, and likely are susceptible to underseepage.

Levees along the reach SF-II are underlain by a Holocene paleochannel and historical meander scroll deposits (Figure 2, Plate 1). These deposits are coarse grained, laterally continuous and poorly consolidated, and likely are susceptible to underseepage. The presence of this paleochannel deposit suggests locally permeable material (channel fill) directly underlying the levees. Historical alluvium most likely of mining debris origin, blankets the Yuba City airport paleochannel and meander scroll deposits. The levees along this reach are underlain by a thick sequence of young, permeable alluvium of meander scroll deposits that are highly susceptible to seepage (Glynn and Kuszmaul, 2004).

Reach SF-III consists of coarse-grained avulsion deposits (overbank, crevasse splay and overflow channel deposits) overlying the Modesto Formation. Overflow channels (Rofc) are common along this reach, are relatively thin, slightly inset to the Modesto Formation and are filled with poorly consolidated sediments that may provide local pathways for underseepage. Individual shallow coarse deposits may be laterally discontinuous and may be separated by clayey interbeds (i.e. thin blankets). Local coarse deposits may be associated with higher likelihoods of levee underseepage. Deeper deposits probably consist of consolidated Modesto Formation with occasional small, but unconsolidated, overflow channel deposits incised into resistant strata.

Along Reach SF-IV the levee is underlain by laterally-continuous sandy deposits formed by distributary overbank fans and by the south flowing ancestral Feather River (Gilsizer Slough). These coarse-grained deposits likely are permeable and susceptible to underseepage. Near Laurel Avenue distributary channel deposits underlie the levees and may be relatively coarser than the surrounding alluvium.



6.0 Summary

Lateral and vertical variability in the shallow subsurface deposits has resulted from past geomorphic processes. Surficial geologic mapping along the south Feather River allows reach classifications within which conditions may be relatively consistent. The conceptual subsurface stratigraphic framework suggests that stratigraphic relationships may promote localized levee underseepage, given certain hydraulic conditions, particularly along reach SF-I and II. Further spatial analyses of the surficial geologic mapping and subsurface geotechnical exploration data are needed to better constrain and characterize areas that are most susceptible to underseepage in the study area.

7.0 Limitations

This geomorphic assessment and associated data interpretation have been performed in accordance with the standard of care commonly used as the state-of-practice in the geologic engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this geographic area performing the same services under similar circumstances during the same time period.

Discussions of surface and subsurface conditions summarized in this technical memorandum are based on geologic interpretations of subsurface soil data at limited exploration locations available to this assessment through August of 2007. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions in the levee and its foundation. This memorandum is for the use and benefit of DWR. Use by any other party is at their own discretion and risk.



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- USGS, Nicolaus topographic quadrangle, surveyed 1908, published 1910; map scale 1:31,680, five foot contour interval.
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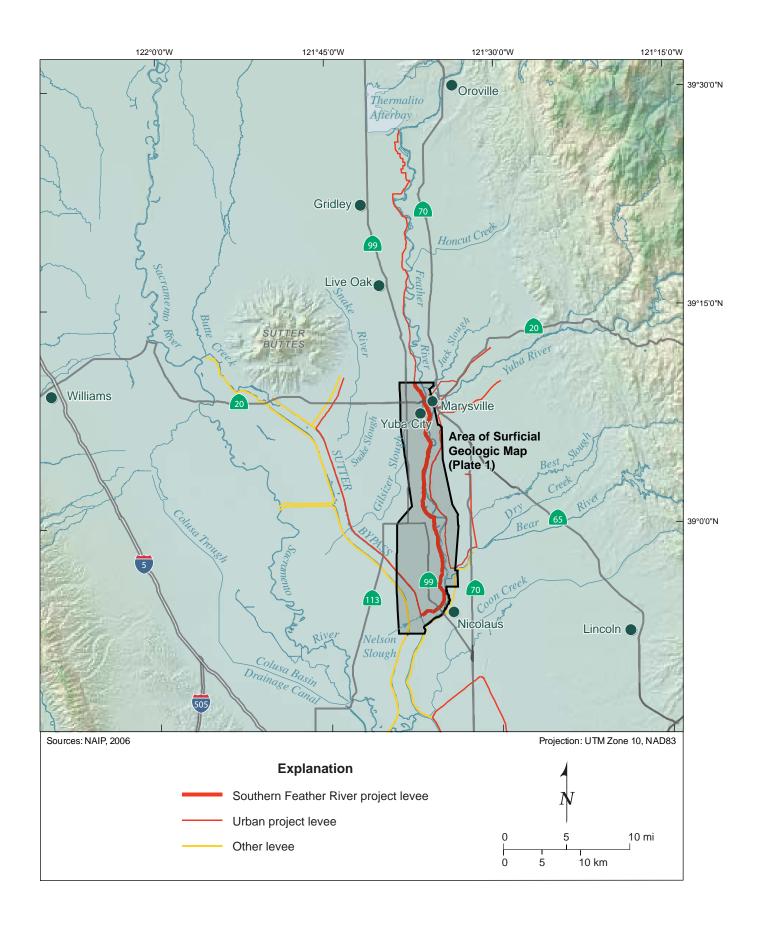


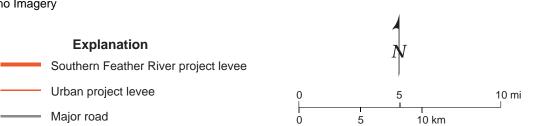
Figure 1



A. 1937 USDA Air Photo

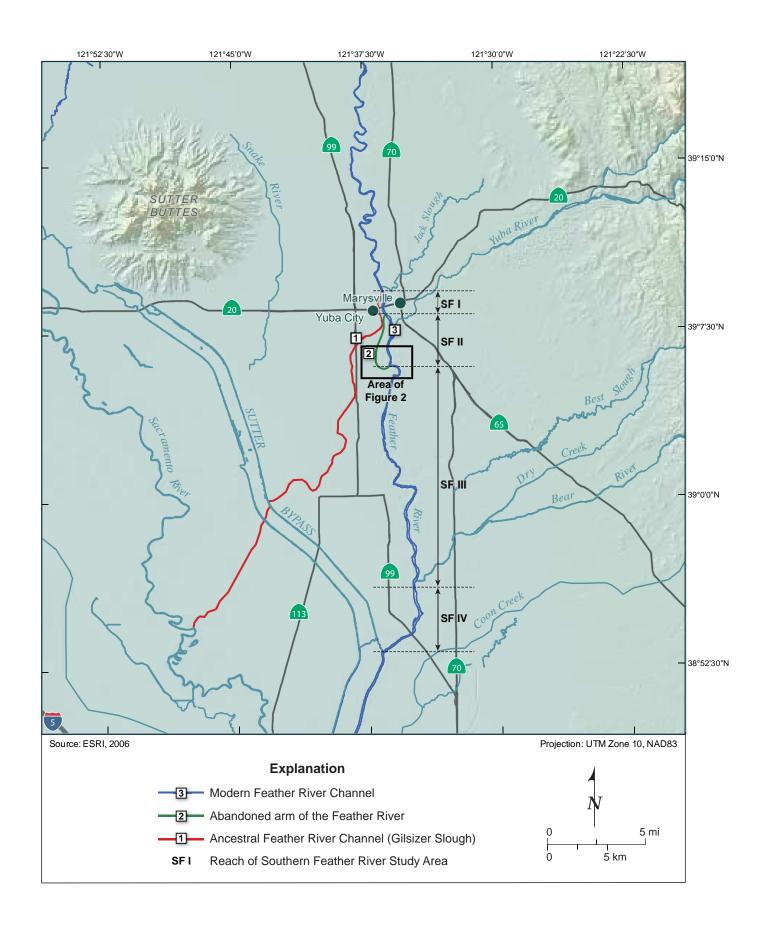


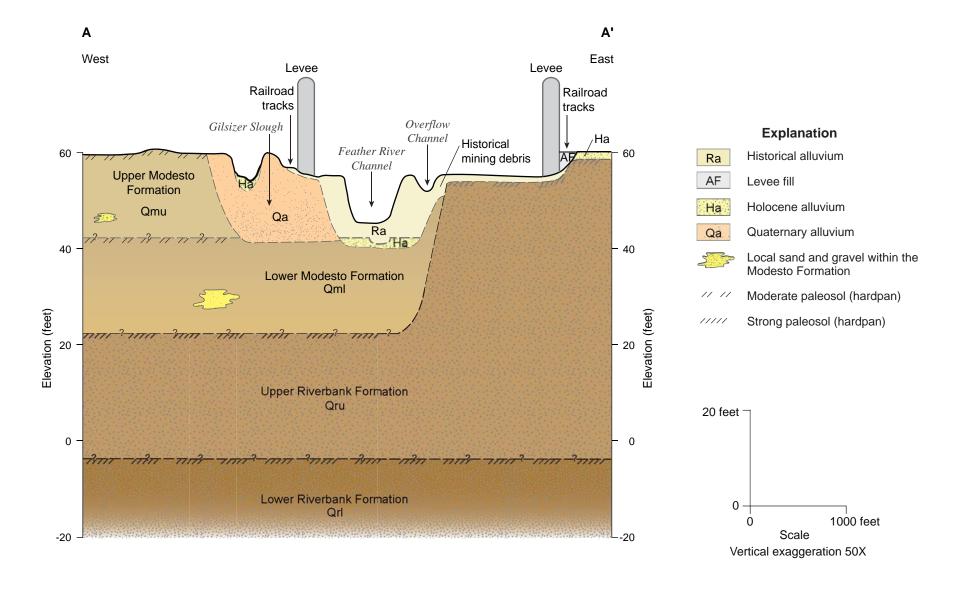
B. 2006 NAIP Ortho Imagery



DWR URBAN LEVEE PROJECT Figure 2

1881 South Feather River Modified 09.03.09





North South N52°W N30°W N68°W N29°W N22°W N31°W N46°W **←** WL001 WL001 WL001 WL001 WL001 07S 042C 041B 040C 06S Levee fill (AF) Silty Sand -20 -20 (Recent Overbank Deposits, Rob) Rob Rob Rob -40 Sandy silt with lenses of sand Depth below ground surface (feet) Upper Modesto Formation, Qmu) 17177 Sandy clay with lenses of silty sand (Lower Modesto Formation, Qml) -60 Silty sand to sandy silt Upper Riverbank Formation, Qru) -80 -80 -100 -100 Silty sand with pockets of gravel (Lower Riverbank Formation, Qrl)

B.O.H. 120 ft. B.O.H. 132.5 ft. B.O.H. 140 ft.

Explanation

Recent crevasse splay, surficial geologic map unit Rcs

Local sand and gravel within the Riverbank Formation

// // Moderate paleosol (hardpan)

//// Strong paleosol (hardpan)

N46°W Bend in Section

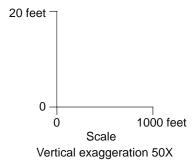
Notes: 1. See Plate 1 for location of cross section.

- 2. Surficial geologic units and contacts from this study and Helley and Harwood (1985).
- 3. Bottom of hole (BOH) values shown as total depth below ground surface.
- Borehole names and horizontal distance shown above from draft URS logs and location maps. Geologic relations could change if borehole locations revised
- 5. Drilling method indicated as last letter in borehole names:

S = Sonic Vibracore;

C = Cone Penetrometer Test;

B = Mud Rotary with SPT



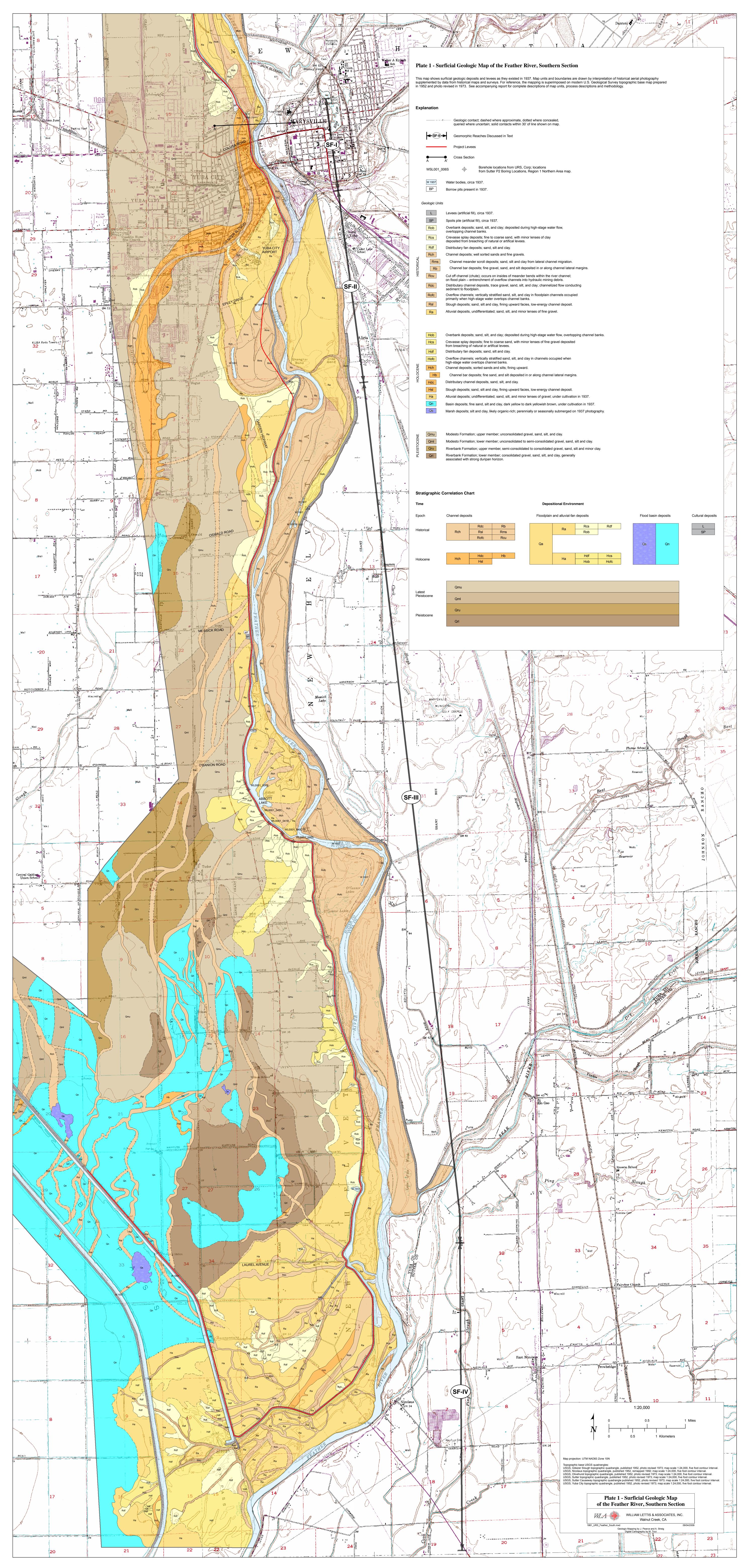
-120

B.O.H. 140 ft.

B.O.H. 140 ft.

-120

Figure 5





1777 Botelho Drive, Suite 262, Walnut Creek, California 94596 tel (925) 256-6070 fax (925) 256-6076

September 8, 2009

Mr. Juan Vargas URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento, CA 95833

RE: Surficial geologic mapping and geomorphic assessment, California Department of Water Resources Urban Levees Project, Sutter Bypass, Sutter County, California

Dear Mr. Vargas:

This memorandum presents the surficial geologic mapping and preliminary geomorphic assessment of the eastern Sutter Bypass area, for the California Department of Water Resources (DWR) Urban Levees Project geotechnical characterization. The goal of this mapping and geomorphic assessment is to provide information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees along the eastern part of the bypass. The purpose of this study is to develop spatially-continuous geologic data and a conceptual model that allows reasonable stratigraphic interpretations between widely-spaced subsurface explorations, with respect to potential levee underseepage (i.e., Llopis et al., 2007). This letter presents the technical approach, surficial geologic map, conceptual geomorphic model, and initial results based on map analysis and preliminary review of available Phase 1 geotechnical data.

We appreciate the opportunity to provide these geomorphic and geologic data and preliminary interpretations of the shallow stratigraphic conditions in the Sutter Bypass study area. Please do not hesitate to call either of the undersigned if there are any questions or comments.

Respectfully,

WILLIAM LETTIS & ASSOCIATES, INC.

Justin Pearce, C.E.G. 2421

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Jutu Peace

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Will Helson

1881 DWR Urban Levees 9/15/2009



1.0 Approach

The approach to developing a surficial geologic map of the Sutter Bypass area (Figure 1, Plate 1) consisted of analysis of the following data: Aerial photography (black and white stereo-pairs taken in 1937, ~1:20,000-scale); early USGS topographic maps (i.e., 1911); published surficial geologic maps (Helley and Harwood, 1985); early and modern soil survey maps (Strahorn et al., 1911; Lytle, et al., 1988); field reconnaissance visit on June 22, 2007; and other maps and documents. Synthesis of these data allow for the development of a detailed surficial geologic map that provides an initial understanding of primary geomorphic processes that have acted in the study area during recent and historical geologic time. Through this mapping, we identify primary geomorphic features and associated surficial geologic deposits, such as abandoned paleochannels, marsh and basin deposits, flood-basin deposits, and other features commonly associated with flood-basins adjacent to large, active river systems. Knowledge of fluvial processes and the ability to recognize depositional environments in the geologic record are key to identifying locations along levees where underseepage is most likely to occur (Llopis, 2007).

The surficial geologic map was developed at the nominal scale of the aerial photography (1:20,000). This scale establishes the resolution of the map (Plate 1). The map unit contacts shown on the surficial geologic map should be considered approximate, and accurate to no more than about 30 feet on either side of the line shown on the map. The 1937 aerial photographs are the primary data set for interpreting the surficial geologic deposits because: (1) they are the oldest high-quality images that pre-date much of the urbanization and landscape alteration within present-day Sutter County (Figure 2); and, (2) these data represent a close approximation to the surficial deposits that were likely present at the ground surface prior to the construction of the levees. The 1937 photographs generally were taken in late summer or early autumn (i.e., August). By 1937, the area had experienced moderate cultivation that locally obscures geomorphic conditions. However, integration of data from the 1937 photography, old and recent topographic maps, geologic maps, soil surveys and historical documents provides sufficient information to delineate many of the pre-historic and historic surficial deposits in detail. Taken together, these data provide key insights to the geomorphic processes and resulting deposits that may affect levee underseepage.

Additional flood-basin or floodplain deposition may have occurred after 1937, due to flood overflows, levee overtopping, or localized levee failure. A time series analysis that interprets successive aerial photographs taken after major flood events (i.e., 1955) or known local levee failures (i.e., 1986) may reveal additional information on surficial deposits in the Sutter Bypass area. Such analyses are beyond the scope of this study. The data and interpretations presented herein address the primary goal of characterizing the type and distribution of deposits likely present directly beneath the project levees.

1.1 Report Preparation Quality Control

The surficial geologic map data and geomorphic interpretations presented in this memorandum were subject to quality control and quality assurance procedures as required by the Levee



Geotechnical Evaluation Project Management Plan (PMP). The surficial geologic map data developed by this study were reviewed for accuracy and completeness through an internal review and an independent technical review by Dr. Janet Sowers of WLA. Results of QA/QC review were documented using PMP Exhibit 2.2-3 (Independent Technical Review Report) and are kept on file according filing control plan. Subsurface data shown on diagrams were provided as draft information, and were not verified for accuracy or completeness by this study.

2.0 Geologic Setting

The Sutter Bypass (Bypass) study area lies southeast of the volcanic Sutter Buttes, between the Sacramento and Feather Rivers. The project levee addressed in this study borders the eastern side of the Sutter Bypass, extending from the Wadsworth Canal southeast to the Feather River (Figure 1). The Bypass levee generally trends northwest-southeast, and ties in to the Feather River west bank levee.

The Bypass levee lies northeast of Sutter Basin, a low-lying area east of the Sacramento River and west of the Feather River, where overflow and floodwaters from Butte Basin (located northwest of the Sutter Buttes), the Sacramento River, and the Feather River produced a seasonally marshy area. Except for the Sutter Buttes area, the regional land surface is nearly flat, and along the Bypass area gently slopes southwest at an elevation of about 30 to 40 feet. Construction of the Sutter Bypass was completed in 1924 to serve as an overflow for Sacramento River floods in the winter, and a source of irrigation in the summer (DWR, 1976). The eastern levee was enlarged in 1942 (Corps of Engineers, 1953). Prior to cultural modification, surface water runoff in the Bypass area was delivered to the Sutter Basin via intermittent, meandering creeks and sloughs from the northern Central Valley, including: Snake River, Snake Slough, Gilsizer Slough, Nelson Slough, and flood overflow channels emanating from the western side of the Feather River. The construction of the Bypass levee blocks water from the east that normally drains to the Sutter Basin and Sacramento River (DWR, 1976). Presently, many of the natural drainages and channels have been replaced by linear ditches, agricultural drains, and canals (Figure 2).

3.0 Surficial Geologic Mapping

Published surficial geologic maps of the Sutter Bypass study area generalized the surficial deposits primarily as late Quaternary basin (map unit Qb) deposits, with localized units of late Quaternary alluvium, Quaternary Modesto Formation (lower member), and Quaternary Riverbank Formation (lower member) (Helley and Harwood, 1985). These map units were delineated at a regional scale (i.e., 1:62,500). The current analysis of the Bypass uses this geologic framework as a basis for more detailed mapping of late Holocene alluvium and geomorphic features (Plate 1). The surficial geologic map units within the Sutter Bypass study area are described below, in order from oldest to youngest.

The oldest map unit exposed in the study area is the late Quaternary Riverbank Formation (lower member), and is mapped in the south portion of the study area east of Nelson Slough,



where it likely directly underlies the project levee near the latitude of Laurel Avenue (Plate 1). This formation (map unit Qrl) is present in the shallow subsurface beneath much of the bypass area, and consists of alluvial-fan deposits derived from the Sierra Nevada during the middle Pleistocene (about 400,000 to 200,000 years ago). The Riverbank Formation is semiconsolidated, and is associated with the presence of a well-developed hardpan (or, duripan) layer that is a product of soil-forming processes over substantial geologic time. This hardpan layer reflects an ancient land surface that locally is buried by younger deposits. Soils developed on the Riverbank Formation in the Bypass area include the San Joaquin loam of Strahorn et al. (1911) and the Yuvas loam (Lytle et al., 1988), both of which document a strongly cemented hardpan at depths of about 1.5 to 3 feet below ground surface.

The late Pleistocene Modesto Formation is younger than the Riverbank Formation and is present in the map area primarily along the margin of Gilsizer Slough and directly east of Highway 113 (Plate 1). This unit is divided into two members, a lower (older) unit that is about about 42,000 to 29,000 years old (Qml), and an upper member that is about 24,000 to 12,000 years old (Qmu) (Helley and Harwood, 1985). The Modesto Formation, in general, consists of unconsolidated sand, silt, and clay, and is associated with a moderate amount of secondary (pedogenic) clay accumulation. This clay-rich horizon may form laterally continuous zones of low hydraulic conductivity. These soil horizons may extend across boundaries between coarse and fine-grained strata within the latest Pleistocene alluvium, and may form relatively continuous zones of low vertical hydraulic conductivity within the Modesto Formation. Soils developed on the Modesto Formation include the Gridley loam of Strahorn et al. (1911) and the Marcum clay loam with "siltstone" hardpan (Lytle, 1988).

Younger surficial deposits overlying the Riverbank and Modesto Formation include late Quaternary marsh, basin, and alluvial deposits (map units Qs, Qn, and Qa, respectively), which are considered Holocene age (i.e., less than 11,000 years old). The widespread basin deposits are about 4 to 8 feet thick and bury the gently southwest dipping Modesto Formation (Figure 3). The thickness of the basin deposits increases to the southwest, in the direction of Sutter Basin (Figure 3). The soils developed on the basin deposits generally are associated with the Stockton clay adobe and Marcuse clay of Strahorn et al. (1911) and the Oswald clay (Lytle et al., 1988), and thus represent immature soils with overall fine-grained textures. Undifferentiated alluvial deposits (map Qa, Plate 1) are present along Gilsizer Slough, and are inset (i.e., topographically lower) into the adjacent Modesto Formation. The Quaternary marsh deposits (map unit Qs, Plate 1) are present between the Sutter Bypass levees northwest of Gilsizer Slough, and are also fine-grained deposits that are differentiated from basin deposits by usually being underwater or having standing water at the time when the 1937 photographs were taken (usually late summer to early autumn).

Inset into the units described above are deposits of Holocene alluvial channels (map unit Hch, Plate 1), which are a network of moderately sinuous channels with southwesterly orientations. These channels appear to be mostly filled with sediment by the time of 1937 photographs, and are expressed only locally as subtle topographic lows in the ground surface. Many of these channels extend west of, and therefore cross beneath, the eastern Sutter Bypass levee (Plate 1). The alluvial channels west of Gilsizer Slough start on the alluvial plain as intermittent creeks, and are not directly connected to the Feather River (USGS Tisdale Weir quadrangle, 1911).



The channel deposits are tentatively associated with the Liveoak series, sandy clay loam soil (Lytle et al., 1988), and consist of a lower, sandy unit that fines-upward into an upper, silt and clay layer.

Subdivisions of the Holocene channels include sloughs (map unit Hsl, Plate 1), distributary channels (map unit Hdc), and overflow channels (map unit Hofc). These deposits, in general, also consist of a fining-upward sequence of sand, silt, and clay. The sloughs are present primarily east of Highway 113 (Plate 1) and have southwesterly orientations. The sloughs are ephemeral channels that drain the alluvial plain between Gilsizer Slough and the Feather River. The term "slough" in this study does not mean tidally-influenced channels, but instead channels that likely conveyed relatively slow-moving water from direct precipitation and sheet-flow runoff. The overflow channels convey flood flows that overtop the banks of the Feather River onto the floodplain, and are interpreted as higher-energy channel systems relative to the sloughs. The distributary channels route flow from and sediment onto the floodplain, and end at distributary-fan deposits. The overflow and distributary channel deposits are present in the southeastern portion of the Bypass area, south of the latitude of Laurel Avenue (Plate 1).

Localized deposits related to the Holocene alluvial channels are bars (map unit Hb) that typically occur in the medial and lateral portions of the channels, and distributary fan deposits (map unit Hdf) that occur where the channel becomes unconfined and has deposited sediment on the basin floor. Channel bars are relatively uncommon in the Sutter Bypass study area. Distributary fans are common in the southeast portion of the Bypass area, south of the latitude of Sacramento Avenue (Plate 1). The distributary-fan deposits likely consist of unconsolidated fine sand and silt (i.e., Strahorn et al., 1911).

Historical geologic deposits are present along the length of the Bypass study area (i.e., map unit Rch, map unit Rdf). The term "historical" is applied to deposits that are estimated to be less than 150 years old. These deposits share the same genetic origin as the Holocene deposits described above. The historical channel deposits are differentiated from the Holocene channel deposits on the basis of cross-cutting relationships with other map units, relative degree of geomorphic expression and/or dissection, and correlation with land surface expression on the early and modern topographic maps. The Bypass eastern levee overlies the former locations of Holocene and historical alluvial channels in several locations throughout its length (Plate 1).

Undifferentiated Holocene and historical alluvium (map units Ha and Ra) is mapped in the southeastern Bypass area, near the confluence of the Sutter Bypass and the Feather River, generally east of Sawtelle Road (Plate 1). The undifferentiated map unit is delineated where the morphology of these deposits is indistinguishable on 1937 photographs as a result of cultural modifications (i.e., agriculture). The soils developed on the undifferentiated historical alluvium generally correspond with the Sacramento series fine sandy loam and silt loam of Strahorn et al. (1911) and the Shanghai silt loam (Lytle et al., 1988). There is no hardpan layer associated with these soils, supporting the interpretation of geologically young deposits.



4.0 Conceptual Geomorphic Model

Based on synthesis of surficial geologic mapping, topographic maps, soil surveys, geologic maps, and review of readily available subsurface geotechnical information, we present a preliminary conceptual geomorphic model describing general relationships among surface and subsurface deposits along the Sutter Bypass study area. This conceptual model provides a consistent basis for understanding the type and distribution of surficial geologic deposits, primary geomorphic processes, and shallow subsurface stratigraphy in the area. Identification of subsurface stratigraphic formations is challenging, primarily because of a lack of distinctive and laterally extensive stratigraphic marker beds within late Quaternary deposits of the northern Central Valley (i.e., Page, 1986), and because there is little apparent difference in lithology between the late Quaternary formations (i.e., Helley and Harwood, 1985). This study relies heavily on the identification and local correlation of hardpan horizons and deposit color and density changes to delineate subsurface formations.

In a general sense, the Sutter Bypass levees traverse across the distal portions of ancient alluvial-fan deposits that were derived from the Sierra Nevada, and prograded westward onto the valley floor (i.e., Riverbank and Modesto Formations). These Pleistocene deposits are exposed at the ground surface northeast of the Bypass study area (Helley and Harwood, 1985; Page, 1986), dip to the southwest and are mantled by younger fine-grained basin deposits (Figure 3). In contrast, the Modesto Formation is exposed at the ground surface along Gilsizer Slough and directly east of Highway 113 (Plate 1). The surficial map pattern of the Modesto deposits in these locations suggests depositional lobes from an ancestral Gilsizer Slough. These deposits may have been related to discharges and sediment loads that were higher than present-day conditions. These deposits may, perhaps, represent an ancestral Feather River channel location that occupied the present-day Gilsizer Slough during the latest Pleistocene and was subsequently abandoned.

The surficial geologic mapping (Plate 1) shows differences in deposit type and distribution from northwest to southeast along the Bypass, which are associated with changes in watershed production of water and sediment, related geomorphic processes, soil profile development, and the underlying subsurface hardpan layer. These differences illustrate the diversity of past geomorphic processes along and near the Bypass and, as a consequence, the type of geologic deposits at and near the ground surface. The surficial geologic map allows the interpretation of "reaches" along the Bypass within which geomorphic processes and their associated deposits are likely to be relatively consistent. The Bypass study area consists of four general reaches, from northwest to southeast, each having characteristic deposit types and distributions (Plate 1).

The westernmost reach of the Bypass study area extends from the junction with the Wadsworth Canal to directly south of the Tisdale Weir ("Reach I", Plate 1). The levee along this reach, about 8.1 miles long, primarily overlies fine grained basin deposits accumulated on the valley floor over geologic time. This deposition resulted from flooding of the Sacramento and Feather Rivers, tributaries draining Sutter Buttes, and sheet flow from the generally flat valley floor. Holocene and historical channel deposits (map units Hch and Rch, Plate 1) are inset into the basin deposits. These southwest-trending alluvial channel deposits locally underlie the Bypass



levee, and result in local differences in material textures beneath the levee (Figure 4). About 27 abandoned channels traverse the levee along this reach (approximately 3 channels per levee mile). The channels are about 250 feet wide, but range from about 100 to 300 feet wide (Plate 1). In this area, the channels are about 6 to 8 feet deep, and are typically filled with sand, silt, and clay in a fining-upward sequence, i.e., coarser-grained sand overlain by about one to two feet of silt and clay. This sedimentary sequence may be conducive to seepage where relatively more-permeable channel sands are overlain by a relatively thin, fine-grained "blanket" layer.

The second reach along the Bypass, about 1.1 miles long, extends across Gilsizer Slough ("Reach II", Plate 1), where Modesto Formation deposits are present at the ground surface. Undifferentiated alluvium (map unit Qa, Plate 1) is present along the historically-active Gilsizer channel floor, and is inset to the Modesto Formation (Figure 5). The Gilsizer Slough alluvium extends beneath the eastern and western Bypass levee, and thus represents the progradation of younger deposits with respect to the Modesto Formation. Along this reach, the Bypass levee is underlain by younger Gilsizer Slough alluvium flanked by the relatively denser, semi-consolidated late Pleistocene Modesto deposits (Figure 5). Areas where the levee directly overlies the Modesto Formation may be relatively less conducive to underseepage, as the associated hardpan layer may form locally continuous zones of low hydraulic conductivity.

The third reach along the Bypass extends from the Gilsizer Slough to the latitude directly south of Laurel Avenue, and is about 6.6 miles long ("Reach III", Plate 1). This reach is generally similar to Reach I, except Reach III has Pleistocene deposits (i.e., lower Modesto and Riverbank Formations) exposed at or very near the ground surface, and has a sparser channel density (about 2 channels per levee mile) compared to Reach I. About 14 southerly-oriented sloughs are mapped across this reach and locally underlie the Bypass levee (Plate 1). The sloughs originate from the Feather River, near Star Bend and Shanghai Bend, extending southward toward the Bypass. The sloughs along Reach III are about 250 feet wide, but range from about 100 to 300 feet wide, similar to Reach I (Plate 1). In this area, the channels are also probably about 6 to 8 feet deep, and probably filled with sand fining-upward to silt and clay. These channel deposits may be conducive to underseepage because of the deposit stratigraphy that has coarser-grained sand overlain by about one to two feet of silt and clay. Late Quaternary Riverbank Formation is at the ground surface along the southwestern end of Reach III (Plate 1), and likely is not conducive to seepage due to the dense and strongly-developed hardpan clay layer that is usually at about 1.5 to 4 feet depth below ground surface.

The fourth reach along the Bypass extends from directly south of the latitude of Laurel Avenue to the confluence with the Feather River west bank levee ("Reach IV", Plate 1). Reach IV, about 1.9 miles long, has Holocene and historical alluvium at the ground surface along this reach of the Bypass, primarily because of the proximity to the Feather and Bear Rivers (Plate 1). About 8 distributary channels, usually 90 feet wide but ranging from 45 to 190 feet wide, cross the floodplain in southwesterly orientations, leading to geologically young distributary-fan sediments. These sediments, primarily consisting of fine to coarse sand and silt, probably were deposited as a result of increased sediment and water input contributed to the Feather River from the Bear River; the confluence located directly upstream from this reach of the Bypass (Figure 1). Historically, the Feather River and the Bear River have aggraded from substantial mining debris input, thus reducing channel cross sectional area (i.e., James, 1999).



This reduction of cross section area, coupled with the trajectory of floodflow from the Bear River watershed, resulted in water overtopping the Feather River channel banks, and depositing sediment onto the western floodplain where the Bypass levee is located (Plate 1).

5.0 Applications to the Urban Levee Project

Based on synthesis of the surficial geologic map with preliminary Phase 1 borehole and cone penetrometer (CPT) data, the Bypass levee generally is underlain by relatively young fine-grained clay and sandy clay deposits that are laterally interrupted by local coarser channel fill deposits (i.e., Figures 3, 4, 5, and 6).

The northernmost reach of the Bypass levee ("Reach I") is predominantly underlain in the shallow subsurface by relatively young fine-grained clay and sandy clay deposits. These basin deposits are laterally interrupted by coarser-grained deposits filling abandoned channels that are about 250 wide (Plate 1, Figure 4). Mud rotary borehole WSESBP_011B, which penetrated channel unit Rch norths of Gilsizer Slough (Plate 1), indicates the channel deposit is about four-feet thick, consisting of about 60% fine to coarse sand (medium dense) with clayey sand. The clayey sand grades upward into clay, of about 45% sand fraction. This suggests locally coarse and unconsolidated, and therefore likely permeable, material in the channel fill. Based on review of adjacent borehole data, the basin deposits (Figure 4) generally consist of stiff clay, with less than 10% fine sand. It is likely that most or all of the small channels mapped herein as unit Rch are similar in textural characteristics and depths, because of similar genetic origin and geomorphic process of channel development and infilling. These deposits underlie Reach I in at least 27 places between Wadsworth Canal and Gilsizer Slough (Plate 1).

Reach II crosses late Pleistocene and Holocene geologic deposits associated with Gilsizer Slough (Plate 1). Review of subsurface borehole and CPT data indicate that the basin deposits north of the slough consist of medium stiff to stiff clays (Figure 5). The channel fill deposits within Gilsizer Slough (map unit Qa, Plate 1) consist of alternating beds of sandy gravel and clay. These channel deposits are inset into the lower Modesto Formation which, in this area, consists of very stiff sandy clay interbedded with silty sand and localized dense sand. Directly south of Gilsizer Slough, the lower Modesto Formation is at the ground surface (Plate 1). Subsurface data suggest that a hardpan horizon is encountered at about 3 to 4 feet below the ground surface. The uppermost deposit above the hardpan consists of sand and silty sand, and probably is weathered and/or culturally re-worked materials of the lower Modesto Formation. Thus, north of Gilsizer Slough, potentially low-permeability basin materials blanket the Modesto, and are locally cut by channel deposits, whereas at and south of Gilsizer Slough the local channel deposits are inset directly into the dense Modesto Formation. Where the Bypass levee rests on the unconsolidated Qa deposits within Gilsizer Slough, these coarse deposits may be associated with higher probabilities of levee underseepage. In constrast, the sections of the levee underlain directly by the Modesto Formation containing consolidated (hardpan) horizons are much less likely to experience underseepage.

Reach III is similar in geomorphic nature to Reach I, except it has a lower frequency of channels as compared to Reach I (Plate 1). It is probable that the composition of these deposits



generally will be consistent with those along Reach I (i.e., coarse-grained channel fill with upper fine-grained layers). These channels are more likely to promote seepage beneath the levee compared to the basin deposits. Additionally, the Pleistocene materials that likely directly underlie the project levees along this reach (Plate 1) are relatively dense and the associated hardpan layer may form a relatively continuous zone of lower hydraulic conductivity. Where the levee directly overlies Modesto formation (NW ¼, Section 20; southeast of the Sutter Causeway), there is a lower likelihood of underseepage. There is also a lower likelihood of underseepage where the levee rests on the Riverbank Formation in lower length of Reach III (SW ½, Section 34).

Along Reach IV, geologically young Holocene and historical alluvium is beneath the Bypass levee (Plate 1). This uppermost layer, about five-feet thick, is locally cross-cut by channel deposits that also consist of silt and sand (Figure 6). Quaternary basin deposits do not directly underlie the Bypass levee along this reach. Review of Phase 1 subsurface geotechnical data indicates that these alluvial deposits consist of silty sand and sandy silt textures. Based on review of Phase 1 data in other Project areas (i.e., Marysville), the uppermost alluvium generally has low densities (i.e. loose to medium dense), and consequently relatively high permeability. The surficial mapping indicates that essentially all of this reach of the levee (about 1.9 miles) is underlain by loose, unconsolidated sandy alluvium, which may be susceptible to substantial underseepage. The local recent channels (map units Ra and Rdc; Plate 1) may contain coarser deposits and may be more susceptible to underseepage.

Synthesis of the surficial mapping and geotechnical data indicate that subsurface stratigraphy along the Sutter Bypass area locally may be conducive to levee underseepage. Shallow strata typically include denser and probably semi-consolidated material (i.e., Modesto Formation) that likely contains a moderately developed low-permeability hardpan horizon. The hardpan may or may not be laterally continuous, depending on post-depositional soil formation and erosional processes. Along Reach I and III, the Modesto formation is overlain by about 4 to 6 feet of medium stiff to stiff clay (i.e., basin deposits). The basin materials locally are cross-cut by relatively loose, sandy channel deposits that have a thin fine-grained upper "blanket" layer. Therefore, this shallow subsurface stratigraphy may promote levee underseepage along certain areas of the Bypass project levees that overlie geologically young, loose, sandy channel material lies between the dense Pleistocene deposits and relatively thin, low-permeability clayrich "blanket" layer. Along Reach IV, a layer Holocene and historical alluvium from the Feather River mantles the Modesto Formation, and also may promote levee underseepage.

Lateral and vertical variability in the shallow subsurface deposits has resulted from past geomorphic processes. The conceptual subsurface stratigraphic framework suggests that stratigraphic relationships may promote localized levee underseepage, given certain hydraulic conditions. Further spatial analyses of the surficial geologic mapping and subsurface geotechnical exploration data are needed to better constrain and characterize areas that are most susceptible to underseepage in the study area.



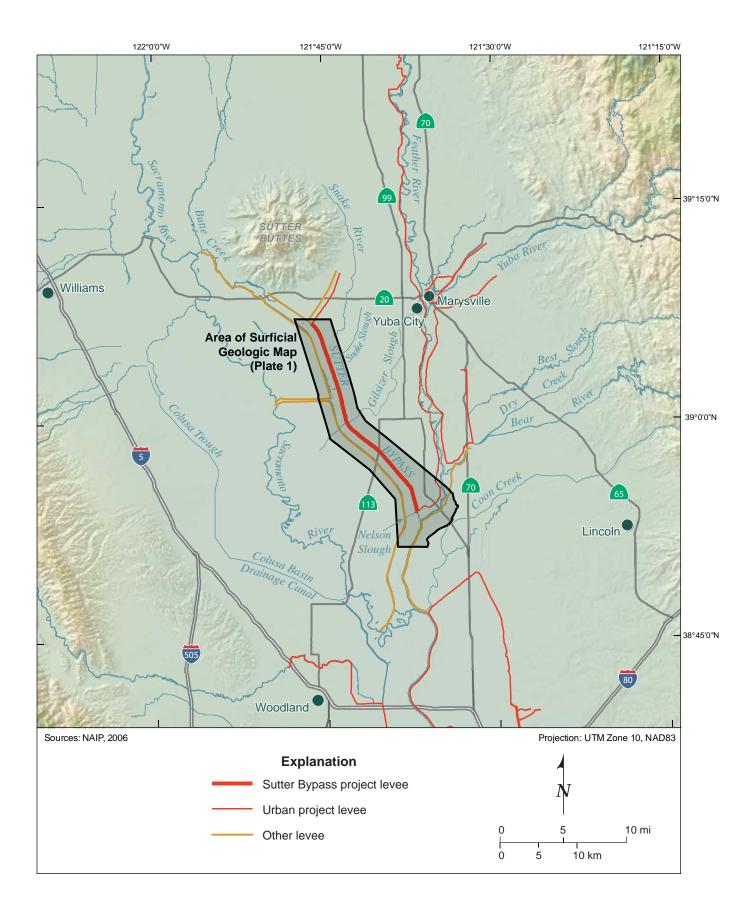
6.0 Limitations

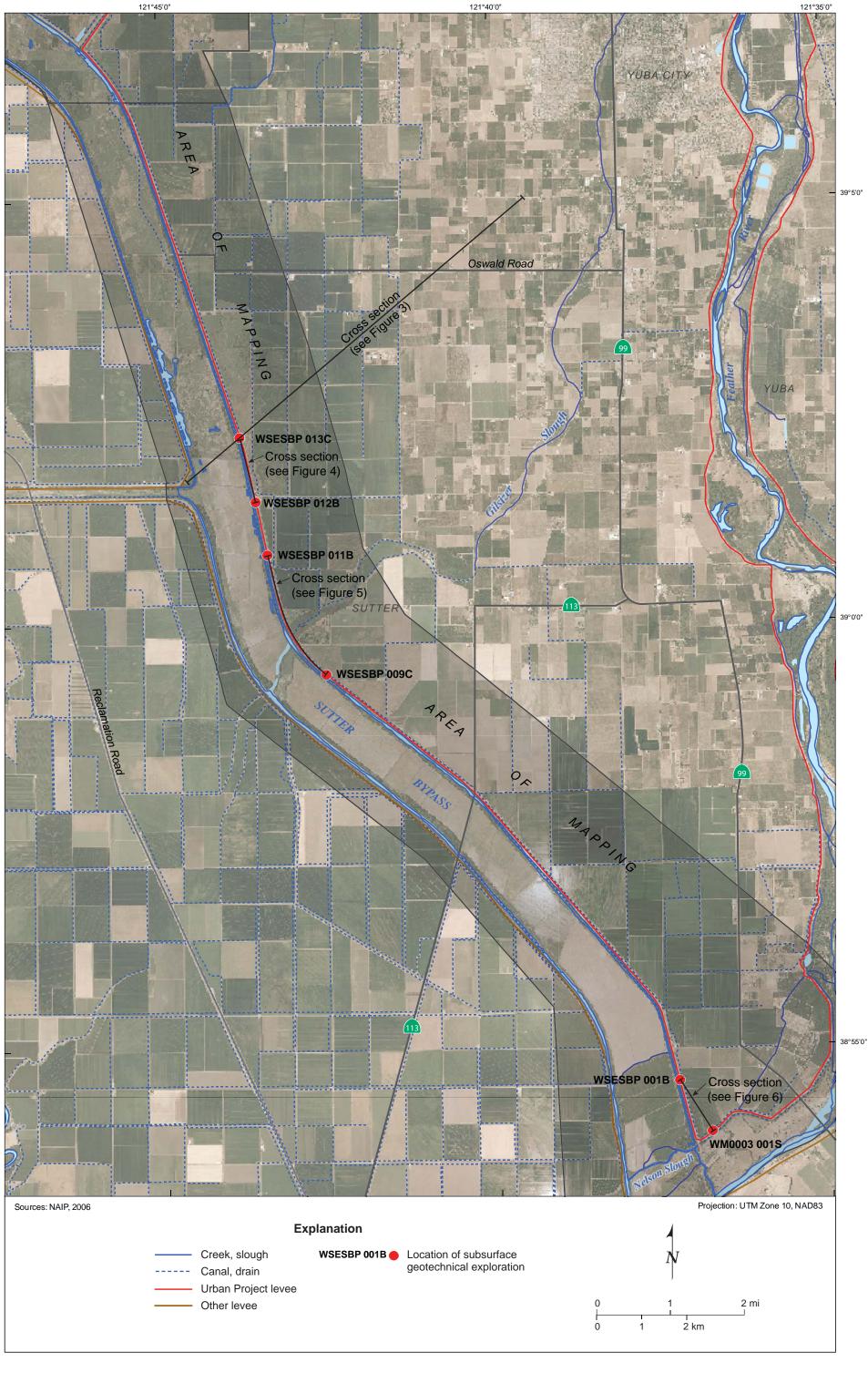
This geomorphic assessment and associated data interpretation have been performed in accordance with the standard of care commonly used as the state-of-practice in the geologic engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this geographic area performing the same services under similar circumstances during the same time period.

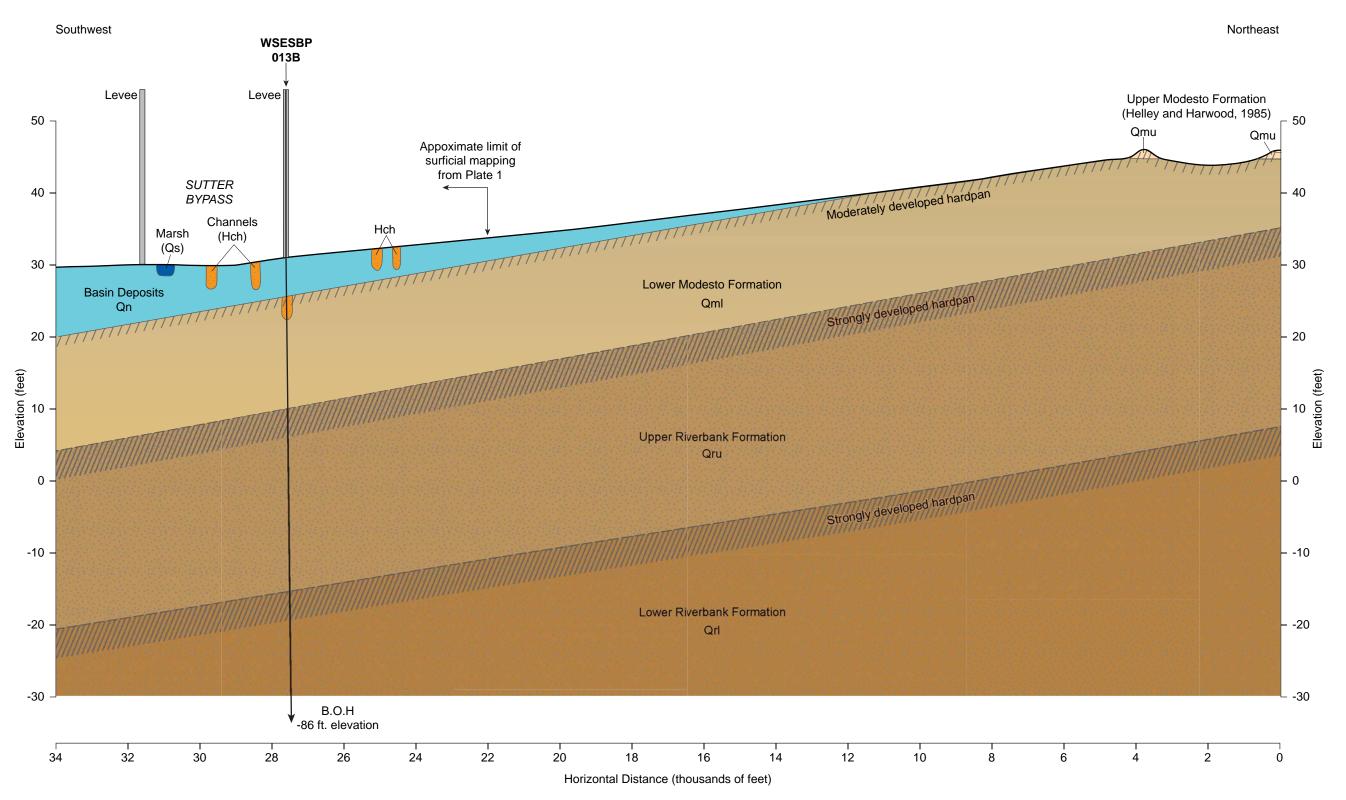
Discussions of surface and subsurface conditions summarized in this technical memorandum are based on geologic interpretations of subsurface soil data at limited exploration locations available to this assessment through August of 2007. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions in the levee and its foundation. This memorandum is for the use and benefit of DWR. Use by any other party is at their own discretion and risk.

7.0 References

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- USGS, Marcuse topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
- USGS, Nicolaus topographic quadrangle, surveyed 1908, published 1910; map scale 1:31,680, five foot contour interval.
- USGS, Tisdale Weir topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.







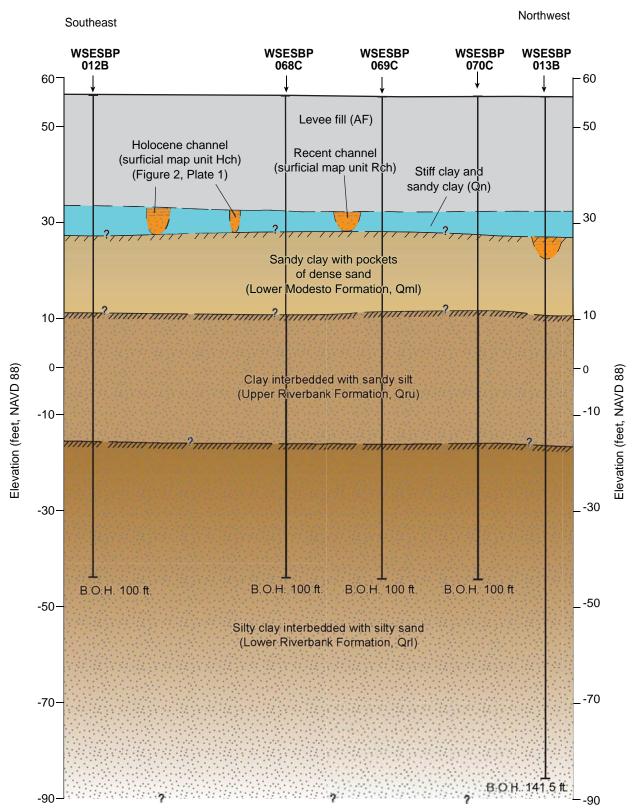
Notes: 1. See Figure 2 for location of cross section.

- 2. Surficial geologic units and contacts from this study and Helley and Harwood (1985).
- 3. Ground surface elevation from USGS Gilsizer Slough topographic map, 5-foot contour interval.

Figure 3

TISDALE WEIR





Explanation



Channel identified on surficial geologic map or as fining upward sequence of sediments in boreholes

//// Moderate paleosol (hardpan)

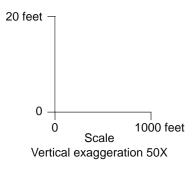
////// Strong paleosol (hardpan)

Notes: 1. Borehole ground elevation values from URS Corp., and reported in the Boring Location Survey, DWR task #10. (NAVD 88).

- CPT borehole surface elevations are approximate, placed on projected ground surface between boreholes WSESBP_012B and WSESBP_013B.
- 3. Bottom of hole (B.O.H.) values shown as total depth below ground surface.
- Borehole names and horizontal distance shown above from draft URS logs and location maps.
 Geologic relations could change if borehole locations are revised.
- Drilling method indicated as last letter in borehole names.

B = Mud Rotary unit with SPT

C = Cone Penetrometer Test.

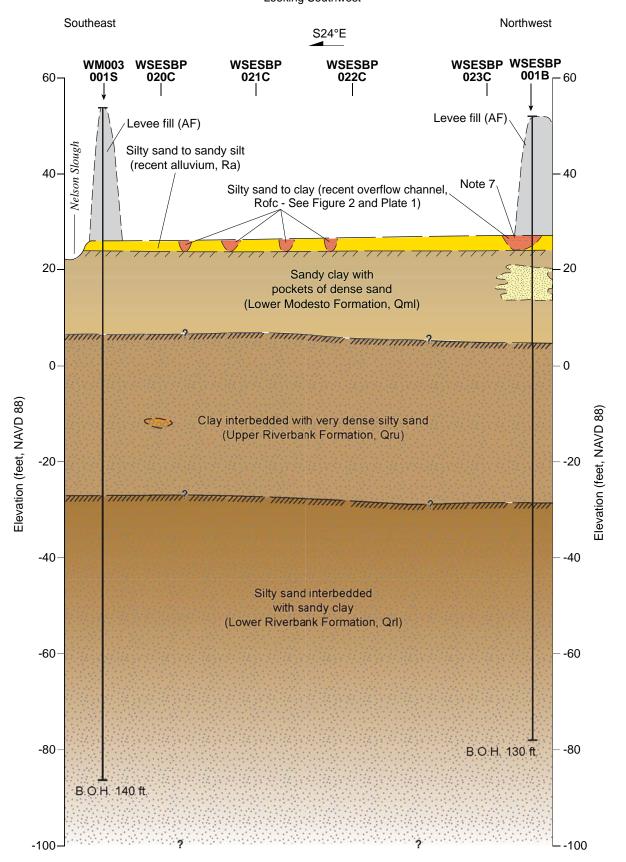


GILSIZER SLOUGH Looking South - Southwest

Northwest **Explanation** Southeast Channel identified on surficial **►** N44°W **►** N27°W ► N15°W geologic map or as fining upward sequence of sediments in boreholes WSESBP 011B **WSESBP WSESBP** WSESBP 057C **WSESBP WSESBP WSESBP WSESBP WSESBP WSESBP WSESBP** 062C 061C Localized sand and gravel; 009B 055C 056C 058C 010B 059B 060C 60 possible channel interpreted from borehole logs - 50 50-Levee fill (AF) //// Moderate paleosol (hardpan) Gilsizer Slough Recent channel Strong paleosol (hardpan) Stiff clay and Holocene channel (surficial map unit Qa) Holocene Recent (surficial map unit Rch) Holocene (surficial map unit Hch) sandy clay (Qn) (see Figure 2, Plate 1) channel (Figure 2, Plate 1) channel channel Bend in levee (Figure 2, Plate 1) N16°W Azimuth of levee segment 30-- 30 Very stiff sandy clay with interbeds of silty sand Notes: 1. Borehole ground elevation values from URS and localized dense sand Corp., and reported in the Boring Location (Lower Modesto Formation, Qml) Survey, DWR task #10.(NAVD 88). 2. CPT borehole surface elevations are 10-10 approximate, placed on projected ground surface between continuous boreholes Hard clay with stiff silty sand WSESBP-009B, WSESBP-010B, and and sandy silt interbeds WSESBP-011B. Upper Riverbank Formation, Qru) Elevation (feet, NAVD 88) Elevation (feet, NAVD 88) 3. Bottom of hole (B.O.H.) values shown as total depth below ground surface. 4. Borehole names and horizontal distance חוווון חווווו shown above (from draft URS logs and location maps). Geologic relations could change if borehole locations are revised. 5. Drilling method indicated as last letter in borehole names. B = Mud Rotary unit with SPT C = Cone Penetrometer -30--30 Very dense sand interbedded with stiff clay and silt (Lower Riverbank Formation, Qrl) B.O.H. 100 ft. -50--50 B.O.H. 100 ft. 20 feet -70--70 B.O.H. 140 ft. 1000 feet Vertical exaggeration 50X

SOUTHERN SUTTER BYPASS

Looking Southwest



Explanation



Channel identified on surficial geologic map or as fining upward sequence of sediments in boreholes



Localized sand and gravel; possible channel interpreted from borehole logs



//// Moderate paleosol (hardpan)



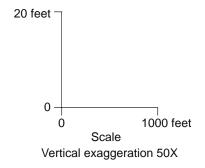
////// Strong paleosol (hardpan)

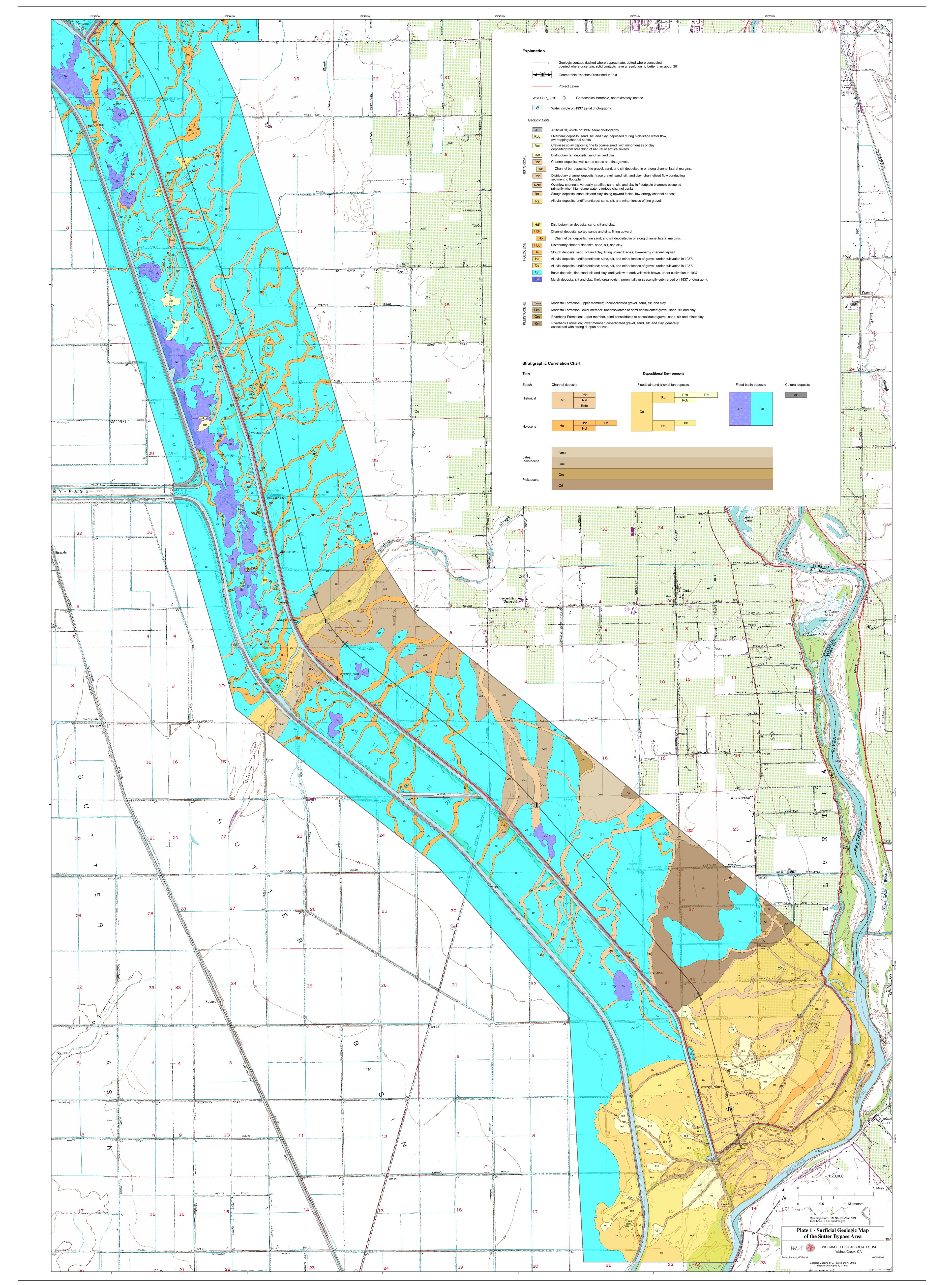


Levee widths and side slopes are schematically

Notes: 1. Borehole ground elevation values from URS Corp., and reported in the Boring Location Survey, DWR task #10. (NAVD 88).

- 2. CPT borehole surface elevations are approximate, placed on projected ground surface between boreholes WM00_001S and WSESBP_001B.
- 3. Bottom of hole (B.O.H.) values shown as total depth below ground surface.
- 4. Borehole names and horizontal distance shown above from draft URS logs and location maps. Geologic relations could change if borehole locations are revised.
- 5. Drilling method indicated as last letter in borehole
 - B = Mud Rotary unit with SPT
 - S = Sonic vibracore
 - C = Cone Penetrometer Test.
- 6. Cone penetrometer borehole locations projected to the trend of this cross section.
- 7. Recent over flow channel shown beneath the northwestern levee intersects the levee at a sub-orthogonal angle. This conceptual cross section intersects the levee and the over flow channel at an oblique angle, as shown in the channel asymmetry.





URS Supplemental Geotechnical Data Report (2010), Appendix O, Volume 4





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September 8, 2009

Mr. Juan Vargas URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento, CA 95833

RE: Surficial geologic mapping and geomorphic assessment, California Department of Water Resources Urban Levees Project, Southern Feather River, Sutter County, California

Dear Mr. Vargas:

This memorandum presents the surficial geologic mapping and preliminary geomorphic assessment of the southern Feather River study area, for the California Department of Water Resources (DWR) Urban Levees Project geotechnical characterization. The goal of this mapping and geomorphic assessment is to provide information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees along the western bank of the Feather River. The purpose of this study is to develop spatially-continuous geologic data and a conceptual model that provides a framework for stratigraphic interpretations between widely-spaced subsurface explorations. A primary goal is to provide a geologic framework for the geotechnical assessment of potential levee underseepage. This memo presents the technical approach, surficial geologic map, conceptual geomorphic model, and initial results based on map analysis and preliminary review of Phase 1 geotechnical data.

We appreciated the opportunity to provide these geomorphic and geologic data and preliminary interpretations of the shallow stratigraphic conditions in the southern Feather River study area. Please do not hesitate to call either of the undersigned if there are any questions or comments.

Respectfully,

WILLIAM LETTIS & ASSOCIATES, INC.

Justin Pearce, C.E.G. 2421

Senior Geologist

Ashley Streig

Senior Staff Geologist

Appley R. Streety

Keith Kelson, C.E.G. 1610

Will Kelson

Principal Geologist



1.0 Approach

The approach to developing a surficial geologic map of the southern Feather River project area (Figure 1, Plate 1) consisted of analysis of the following data: Aerial photography (black and white stereo-pairs taken in 1937, ~1:20,000-scale); early USGS topographic maps (i.e., 1911); published surficial geologic maps (Helley and Harwood, 1985); early and modern soil survey maps (Strahorn et al., 1909; Lytle, et al., 1988); and other maps and documents (Busacca et al., 1989). Synthesis of these data allow for the development of a detailed surficial geologic map that provides an initial understanding of primary geomorphic processes that have acted in the study area during recent and historical geologic time. Through this mapping, primary geomorphic features and associated surficial geologic deposits are identified, such as abandoned paleochannels, channel deposits, floodplain deposits, basin deposits and other features commonly associated with surficial deposits with large active river systems. Knowledge of fluvial processes and the ability to recognize depositional environments in the geologic record are key to identifying locations along levees where underseepage is most likely to occur (Llopis et al., 2007).

The surficial geologic map was developed at the nominal scale of the aerial photography (1:20,000). This scale establishes the resolution of the map (Plate 1), such that analysis of the map data at a more detailed scale than 1:20,000 may introduce uncertainties beyond the original resolution of the data. The map unit boundaries shown on the surficial geologic map should be considered approximate, and accurate within 30 feet on either side of the line shown on the map. The 1937 aerial photographs are the primary data set for interpreting the surficial geologic deposits because: (1) they are the oldest high-quality images that pre-date much of the urbanization and landscape alteration within present-day Sutter County (i.e. Figure 2); and, (2) these data represent a close approximation to the surficial deposits that were likely present at the ground surface prior to the construction of the levees. The 1937 photographs generally were taken in late summer or early autumn (i.e., August). By 1937, the area had experienced moderate cultivation that locally obscures geomorphic conditions. However, integration of data from the 1937 photography, old and recent topographic maps, geologic maps, soil surveys and historical documents provides sufficient information to delineate many of the pre-historical and historical surficial deposits in detail. Taken together, these data provide key insights to the characteristics of shallow deposits beneath the levees, as well as the geomorphic processes responsible for their distribution.

Additional floodplain deposition may have occurred after 1937, due to flood overflows, levee overtopping, or localized levee failure. A time series analysis that interprets successive aerial photographs taken after major flood events (i.e., USDA, black and white stereo-pairs taken in 1958, ~1:20,000-scale) or known local levee failures (i.e., 1986) may reveal additional information on surficial deposits in the southern Feather River area. Such analyses are beyond the scope of this study. The data and interpretations presented herein address the primary goal of characterizing the type and distribution of deposits likely present directly beneath the project levees.



1.1 Report Preparation Quality Control

The surficial geologic map data and geomorphic interpretations presented in this memorandum were subject to quality control and quality assurance procedures as required by the Levee Geotechnical Evaluation Project Management Plan (PMP). The surficial geologic map data developed by this study were reviewed for accuracy and completeness through an internal review and an independent technical review by Dr. Janet Sowers of WLA. Results of QA/QC review were documented using PMP Exhibit 2.2-3 (Independent Technical Review Report) and are kept on file according filing control plan. Subsurface data shown on diagrams were provided as draft information, and were not verified for accuracy or completeness by this study.

2.0 Geologic Setting

The southern Feather River study area lies in the Central Sacramento Valley, between the Coast Ranges to the west and the Sierra Nevada foothills to the east. Feather River drains the western slope of the Sierra Nevada, and emerges from the mountains south of the Thermalito Afterbay (Figure 1). The river flows southward from the Thermalito Afterbay, over middle-to late Pleistocene dissected alluvium derived from the Sierra Nevada. The regional land surface is nearly flat, with a gentle west-southwest slope that flattens out south of the Sutter Buttes, in Sutter Basin. The Feather River is entrenched into middle to late Pleistocene semi-consolidated sediments. Holocene alluvium deposited by the Feather River is present between the present-day levees, inset to the older formations, as well as on the western floodplain as subdued natural levees. The river trends roughly south until its confluence with the Bear River, where it curves

to the southwest (Figure 1). The Feather River lies east of, and is a tributary to the Sacramento River, converging near the town of Nicolaus (Figure 1). A primary influence on the historic processes in the river system was the hydraulic mining that began in the 1850's. Mining occurred through the early 1900's in the Feather, Yuba and Bear River watersheds, and abruptly introduced large quantities of sediment, drastically changing the geomorphic characteristics of these river systems (DWR, 2004; Ellis, 1939). Aggradation within the stream channel was a primary response to the introduction of substantial mining debris (James, 1999), consequently young alluvial deposits are common throughout the study area.

3.0 Surficial Geologic Mapping

Previous geologic mapping in the study area along the Feather River and surrounding areas generalize the surficial deposits as: Quaternary Alluvium (Qa) and Quaternary stream channel deposits (Qsc) within and proximal to the modern Feather River channel, (Helley and Harwood, 1985). These map units are considered Holocene age (less than 11,000 years old). Late Quaternary Modesto Formation (Qmu, Qml) is mapped along the western margin of the floodplain. These map units were delineated by Helley and Harwood (1985) at a regional scale (i.e., 1:62,500). The current analysis of the Feather River uses this geologic framework as a basis for more detailed mapping of late Holocene alluvium and geomorphic features (Plate 1).



The surficial geologic map units within the southern Feather River study area are described below, in order from oldest to youngest. Surficial geologic mapping for this study subdivides these map units and delineates individual deposits based on relative age and depositional process or environment (Plate 1). The map units depicted on Plate 1 are based primarily on analysis of 1937-vintage photography, and thus the map essentially is a "snapshot" of geologic conditions at this time.

The oldest unit exposed along the Feather River is the lower member of the Riverbank Formation (Qrl) of Helley and Harwood (1985). This unit is a highly dissected alluvial surface with textures of weathered gravel, sand and silt with strong soil-profile development. The Riverbank Formation is semi-consolidated, and is associated with the presence of a well-developed hardpan (or, duripan) layer that is a product of soil-forming processes over substantial geologic time. This hardpan layer reflects an ancient land surface that locally is buried by younger deposits. The Riverbank Formation is late to middle Pleistocene in age, and is estimated to be 130,000 to 450,000 yrs old (Helley and Harwood, 1985). The upper member is unconsolidated dark brown to red alluvium consisting of gravel, sand, silt and minor clay (Busacca et al., 1989, Helley and Harwood, 1985).

The Modesto Formation is divided into two members, a lower (older) unit that is latest Pleistocene in age (about 29,000 to 49,000 years old), and consists of unconsolidated slightly weathered gravel, sand, silt and clay. The upper member, a younger unit, is latest Pleistocene age (circa 12,000 to 26,000 years old) (Helley and Harwood, 1985). This unit (Qmu) is composed of sand, silt, and some gravel, comprising river channel and floodplain deposits, and is associated with a moderate amount of secondary (pedogenic) clay accumulation. This clay-rich horizon may form laterally continuous zones of low hydraulic conductivity, and may extend across boundaries between coarse and fine-grained strata within the latest Pleistocene alluvium. Soils on the Modesto Formation deposits include the Gridley loam of Strahorn et al. (1909) and the Conejo complex of Lytle et al. (1988).

Latest Holocene deposits overlie or are inset into the Modesto Formation, and are categorized as channel, floodplain, and basin deposits (Plate 1). Channel deposits include Holocene channels (Hch), distributary channels (Hdc), overflow channels (Hofc), sloughs (Hsl), instream or lateral bars (Hb), and meander scrolls (Hms). These deposits likely consist of fine to coarse sand, silty sand, and clayey sand, with trace fine gravel. Holocene channel deposits (Hch), which are present along Gilsizer Slough and the western floodplain as secondary channels, contain fining-upward sequences of sand, silt and clay. Overflow channels (Hofc) transport water across the land surface during high flow stages toward Sutter Basin. Networks of sloughs wander across the distal floodplain, and are likely filled with a fining-upward sequence of silt and clay (map unit Hsl). These deposits are associated with former channels, and generally are present landside (outboard) of the present-day human-made levees.

Holocene floodplain deposits include crevasse splays (Hcs), distributary fans (Hdf), and overbank deposits (Hob). Crevasse splays (Hcs) are sandy deposits that form from breaching of river banks or natural levees. Distributary fan deposits (Hdf) occur when water and velocity within a distributary channel decreases, can no longer transport its sediment load, and sediment is laid down on the floodplain. Overbank sediments are formed by localized overtopping of



river banks or natural levees, subsequent deposition from shallow sheet flow or standing water. Basin deposits occur on the distal floodplain and include undifferentiated basin deposits (Qn), and marsh deposits (Qs). Basin and marsh deposits are present in the topographically low areas west of the present-day natural levees along the Feather River. These deposits consist of fine sand, silt, and clay laid down in a relatively low-energy depositional environment. Soils developed on these deposits are the Sacramento series silt loam, fine sandy loam, clay, Alamo clay loam adobe and Stockton clay adobe. Marsh deposits are generally saturated and are often underwater in the present-day environment. Undifferentiated Holocene and Quaternary alluvium (Ha and Qa, respectively) usually are proximal to the river channel, and this map unit is used in areas where geomorphic features are obscured or obliterated by historical (1937-era) agriculture or cultivation. The deposits within these agriculturally modified areas are assigned a relative age (Ha or Qa) based on overlapping and cross cutting relationships with the surrounding deposits as follows: Ha if the agriculture-modified area is mapped within or shown overlying Holocene deposits; or Qa where it is difficult to evaluate the surface age based on the nearby deposits. Soils associated with these, undifferentiated units (Qa) are the Sacramento silt loam and Sacramento fine sandy loam, (Strahorn et al., 1909), and the Columbia fine sandy loam of Lyle et al. (1988), which are weakly developed soils commonly developed on relatively young deposits.

Historical deposits mapped in the area include stream channel and floodplain deposits, as well as artificial fill deposits (L and SP) (Plate 1). Historical deposits are estimated to be less than 150 years old, dating from approximately 1800 to 1937. Historical stream channels (Rch), distributary channels (Rdc), and overflow channels (Rofc) within the floodplain are recently abandoned channels or reflect active channels with low water flow. Lateral bar deposits (Rb) and meander scrolls (Rms) are located adjacent to the present-day Feather River, and are generally present inboard (waterside) of the present-day Feather River levees. When the river overtops its banks, distributary channels (Rdc) and recent overflow channels (Rofc) transport water and sediment across the floodplain. These channel deposits likely consist of silt and sand with traces of gravel. The upper few feet of these deposits probably are filled with debris from upstream hydraulic mining activities. Historical sloughs transport low velocity water flow derived from distributary channels proximal to the Feather River onto the distal floodplain and into the Sutter Basin. Slough deposits (Rsl) likely consist of fining-upward silt and clay.

Historical flood plain deposits include crevasse splay (Rcs), distributary fan (Rdf), and overbank (Rob) deposits, which generally consist of a fining upward or episodic fining upward sequence of sand, silt, and clay. Historical overbank (Rob) deposits are slightly finer grained sand, silt, and clay deposited via sheet flow when the river is at flood-stage and overtops natural and artificial levees. These historical deposits are differentiated based on cross-cutting and superposition relationships relative to existing cultural deposits visible on the 1937 photographs. Historical alluvial deposits (Ra), generally located within the Feather River channel, consist of undifferentiated sand, silt, and minor lenses of gravel. Historical artificial fills (map units L and SP) are culturally-emplaced heterogeneous deposits, with varying amounts of clay, silt, sand, and gravel from local sources. These deposits include levee structures and canal levee systems (L), and some undifferentiated soil piles (SP), and are shown on the surficial geologic map where present and identifiable on the 1937 photography.



Mapping of historical and Holocene deposits shown on Plate 1 generally is consistent with early, less-detailed soil survey mapping along the western banks of the Feather River as areas of Gridley loam, Sacramento Series fine sand, sandy loam and silt loam soils (Strahorn et al., 1909). The Gridley loam occurs along the northern Feather River from Thermalito south to the confluence with the Bear River, and closely corresponds to the Modesto Formation of Helley and Harwood (1985). The relationship between the mapped surficial geologic units and the potential for underseepage is summarized below.

4.0 Geomorphic Conceptual Model

The preliminary conceptual model described here is based on general relationships among surface and subsurface geologic deposits along the Feather River, as described above and shown on Plate 1. This conceptual model provides a consistent basis for understanding the type and stratigraphy in the area.

Published geologic maps of the project area identify a complex series of westward aggrading alluvial fans and terraces derived from the Sierra Nevada, identified as the Riverbank and Modesto formations. The Riverbank Formation and Modesto Formation are semi-consolidated to unconsolidated deposits characterized by intraformational paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. The Riverbank Formation unconformably overlies the Laguna Formation, which is a deeply dissected alluvial surface (Busacca et al., 1989).

Subsurface deposits about 150 feet beneath the ground surface rest on a resistant volcanic tuff capped by interbedded alluvial gravel, sand and silt, interpreted as Pliocene-Pleistocene age Laguna Formation that represents a period of relatively stable landscape conditions (Helley and Harwood, 1985). The Laguna Formation is overlain by the Pleistocene Riverbank Formation, (very dense gravel deposits) that are, in turn, overlain by a medium dense sand and gravelly sand package of the latest Pleistocene Modesto Formation (Busacca et al., 1989). The upper member of the Modesto Formation is exposed at the ground surface adjacent to the western bank of the Feather River south of Marysville and Yuba City. The Modesto Formation is mantled by unconsolidated deposits of Holocene age that comprise most of the surficial geologic deposits along the western side of the Feather River (Plate 1).

Geomorphic evidence suggests that the Feather River system south of Yuba City may have been located west of its present course (Figure 3). The present-day Gilsizer Slough diverges from the modern Feather River directly north of Yuba City and trends southwestward toward the Sacramento River. Alluvial deposits of Gilsizer Slough are inset (i.e. incised) into the Modesto Formation from Yuba City southward. The ancestral Gilsizer Slough perhaps extended to as far as the Sacramento River (Figure 3), based on surficial mapping not included in this report, and inspection of topographic maps. The ancestral Gilsizer Slough deposits are related to discharges and sediment loads that were higher than present-day conditions, and perhaps is an ancestral course of the Feather River.



Surficial geologic deposits near the Yuba City airport indicate the Feather River occupied an intermediate position between ancestral and present locations. The river occupied an abandoned channel arm north of Shanghai Bend, located between Gilsizer Slough and the modern Feather River (Figure 3). From this point the river continued southward in nearly its present location. This paleochannel had a sharp, more exaggerated bend than the present-day channel at Shanghai Bend (Figure 2). The channel subsequently moved eastward, laterally backfilling and abandoning the meander above Shanghai Bend, and moved to the rivers' present location closer to Marysville. Today, Gilsizer Slough is a natural bypass for high water flow stages on the Feather River, in the area between Marysville and Yuba City (Ellis, 1939).

Surficial geologic mapping (Plate 1) shows differences in deposit type and distribution from north to south along the Feather River, which is associated with changes in watershed production of water and sediment, related geomorphic processes, soil profile development, and the underlying subsurface hardpan layer. These differences illustrate the diversity of past geomorphic processes along the river and, as a consequence, the type of geologic deposits at and near the ground surface. The surficial geologic map allows the delineation of reaches along the river within which geomorphic processes and their associated deposits appear to be relatively consistent.

Between Yuba City on the north to the confluence with the Sutter Bypass on the south, the southern Feather River consists of four major reaches, each having characteristic deposit types and distributions. The river reaches are numbered Southern Feather one through four (SF-I through SF-IV), sequentially from north to south (Plate 1, Figure 3). This report describes the surficial geologic characteristics of Reach SF-I, SF-II, SF-III and SF-IV of the southern part of the Feather River, extending from Yuba City, south to the confluence with the Sutter Bypass.

Reach SF-I, extends from the north end of Yuba City to the Yuba City airport, and is about 1.15 miles long (Plate 1, Figure 3). The Project levee along Reach SF-I trends roughly north-south, and overlies alluvial sediments deposited by the Feather River. In Yuba City the levee rests on Holocene deposits associated with Gilsizer Slough that are inset into the upper member of the Modesto Formation. The active Feather River channel is east of, and inset to these Holocene channel deposits (Figure 4).

The second reach of south Feather River project area, SF-II, extends from the Yuba City airport south to Shanghai Bend, and is about 2.9 miles long. Near the Yuba City airport, and south of the confluence of the Feather and Yuba Rivers, young channel deposits are inset against the Gilsizer Slough channel deposits (Plate 1). From the Yuba City airport, south to Epley Drive (about 1.5 miles), the levees overlie historical alluvium of mining debris origin, map unit Ra. From Epley Drive south to Shanghai Bend Road the levees (about 1.4 miles) overlie historical meander scrolls, map unit Rms, (Figure 2, Plate 1). The levee along this reach, SF-II, primarily overlies Holocene channel fill, historical alluvium and overbank deposits. These channels are likely filled with a fining-upward sequence of gravel, sand and silt, the upper few feet of these features are probably covered by a veneer of sediment derived from upstream hydraulic mining activities (Figure 4).



River Reach SF-III extends from Shanghai Bend on the north to just south of the confluence with Bear River, and is approximately 12 miles long (Plate 1). Along Reach SF-III, the active river floodplain is inset into the upper member of the Modesto Formation. Over geologic time, flooding has lead to the vertical accretion of overbank and crevasse splay deposits onto the Modesto Formation west of the Feather River. Overflow channels and related deposits (Rofc) are common along this reach of the river. Beginning at Shanghai Bend and continuing southward are seven overflow channels that range from approximately 100 to 200 feet wide. The Project levees overlie these channels in the area around Messick Road (Plate 1). A few overflow channels conduct water flow immediately landside of the levees, across a short distance between Shanghai Bend and Oswald Avenue, then converge with the Feather River. The overflow channels are slightly inset to the Modesto Formation, and based on borehole data from locations where these channels cross the Sutter Bypass, are probably 6 to 15 feet deep. These channels are likely filled with episodic fining upward sequences of silt, sand and gravel, representing multiple flood events on the Feather River. The upper few feet of these channels are probably filled with sediment from upstream historic hydraulic mining activities. The river channel widens considerably between Country Club Road (0.5 mile width) and Obanion Road (1 mile width), (Plate 1). Feather River meanders along the eastern edge of Abbott Lake, swings sharply southward into Star Bend, where the river is deflected eastward by a resistant knob of Modesto Formation (which forms Star Bend). Historical crevasse splay and overbank deposits overlie the Modesto Formation from Abbott Road to Star Bend Road, along the western edge of Abbot Lake (Figure 5). These crevasse splay deposits are likely filled with a fining-upward sequence of fine gravel, sand and silt, The upper few feet of these features are probably covered by a veneer of hydraulic mining sediment.

The southernmost reach, Reach SF-IV, extends from the area south of the confluence with the Bear River to the confluence of the Feather River and Sutter Bypass, and is roughly 4 miles long (Plate 1). The sediments underlying the levee along this reach are geomorphically complex, resulting from depositional convergence between the Feather River and Bear River. The Bear River channel deposits large amounts of sediment across the ground surface adjacent to the confluence. The Modesto and Riverbank Formations are exposed at the ground surface adjacent to natural levees immediately north of the Bear River confluence, and north of this reach (Plate 1). These formations are covered by historical alluvium, sourced from the Feather and Bear Rivers. Much of the historical activity along this reach is located near the levee at Laurel Avenue. Here, consisting eight distributary channels (Rdc), typically 90 feet wide but ranging from 45 to 190 feet wide, cross the floodplain in southwesterly orientations, terminating in geologically young distributary-fan sediments. These sediments, primarily consisting of fine to coarse sand and silt, probably were deposited as a result of increased sediment and water input contributed to the Feather River from the Bear River. Historically, the Feather River and the Bear River have aggraded from substantial mining debris input, thus reducing channel cross sectional area (i.e., James, 1999). This reduction of cross section area, coupled with the trajectory of flood flow from the Bear River watershed, resulted in water overtopping the Feather River channel banks, and depositing sediment onto the floodplain between the confluence of the Feather River and Sutter Bypass (Plate 1).



5.0 Applications to the Urban Levee Project

Based on an initial analysis of surface geologic and geomorphic data, the levees bordering the western side of the Feather River from Yuba City to the Sutter Bypass, (Reaches SF-I, SF-II, SFIII and SF-IV) probably are underlain by a veneer of near-surface sandy deposits, or by buried channels that are inset into the Modesto Formation. The preliminary conceptual surface and subsurface geologic relationships as they relate to levee structures and potential underseepage along each reach of the river are described below. This study does not account for any existing seepage mitigation structures, i.e. slurry wall or cutoff wall, which may be present.

Reach SF-I contains the Gilsizer paleochannel deposits, this channel intersects the levees roughly 660 feet south of Lynn Way to Colusa Avenue (Plate 1). Along this length the levees are underlain by coarse channel deposits. These coarse grain deposits are likely laterally continuous and poorly consolidated and relatively highly permeable, and likely are susceptible to underseepage.

Levees along the reach SF-II are underlain by a Holocene paleochannel and historical meander scroll deposits (Figure 2, Plate 1). These deposits are coarse grained, laterally continuous and poorly consolidated, and likely are susceptible to underseepage. The presence of this paleochannel deposit suggests locally permeable material (channel fill) directly underlying the levees. Historical alluvium most likely of mining debris origin, blankets the Yuba City airport paleochannel and meander scroll deposits. The levees along this reach are underlain by a thick sequence of young, permeable alluvium of meander scroll deposits that are highly susceptible to seepage (Glynn and Kuszmaul, 2004).

Reach SF-III consists of coarse-grained avulsion deposits (overbank, crevasse splay and overflow channel deposits) overlying the Modesto Formation. Overflow channels (Rofc) are common along this reach, are relatively thin, slightly inset to the Modesto Formation and are filled with poorly consolidated sediments that may provide local pathways for underseepage. Individual shallow coarse deposits may be laterally discontinuous and may be separated by clayey interbeds (i.e. thin blankets). Local coarse deposits may be associated with higher likelihoods of levee underseepage. Deeper deposits probably consist of consolidated Modesto Formation with occasional small, but unconsolidated, overflow channel deposits incised into resistant strata.

Along Reach SF-IV the levee is underlain by laterally-continuous sandy deposits formed by distributary overbank fans and by the south flowing ancestral Feather River (Gilsizer Slough). These coarse-grained deposits likely are permeable and susceptible to underseepage. Near Laurel Avenue distributary channel deposits underlie the levees and may be relatively coarser than the surrounding alluvium.



6.0 Summary

Lateral and vertical variability in the shallow subsurface deposits has resulted from past geomorphic processes. Surficial geologic mapping along the south Feather River allows reach classifications within which conditions may be relatively consistent. The conceptual subsurface stratigraphic framework suggests that stratigraphic relationships may promote localized levee underseepage, given certain hydraulic conditions, particularly along reach SF-I and II. Further spatial analyses of the surficial geologic mapping and subsurface geotechnical exploration data are needed to better constrain and characterize areas that are most susceptible to underseepage in the study area.

7.0 Limitations

This geomorphic assessment and associated data interpretation have been performed in accordance with the standard of care commonly used as the state-of-practice in the geologic engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this geographic area performing the same services under similar circumstances during the same time period.

Discussions of surface and subsurface conditions summarized in this technical memorandum are based on geologic interpretations of subsurface soil data at limited exploration locations available to this assessment through August of 2007. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions in the levee and its foundation. This memorandum is for the use and benefit of DWR. Use by any other party is at their own discretion and risk.



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- USGS, Marcuse topographic quadrangle, surveyed 1906, published 1910; map scale 1:31,680, five foot contour interval.



- USGS, Nicolaus topographic quadrangle, surveyed 1908, published 1910; map scale 1:31,680, five foot contour interval.
- USGS, Ostrom topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
- USGS, Sutter topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
- USGS, Yuba City topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
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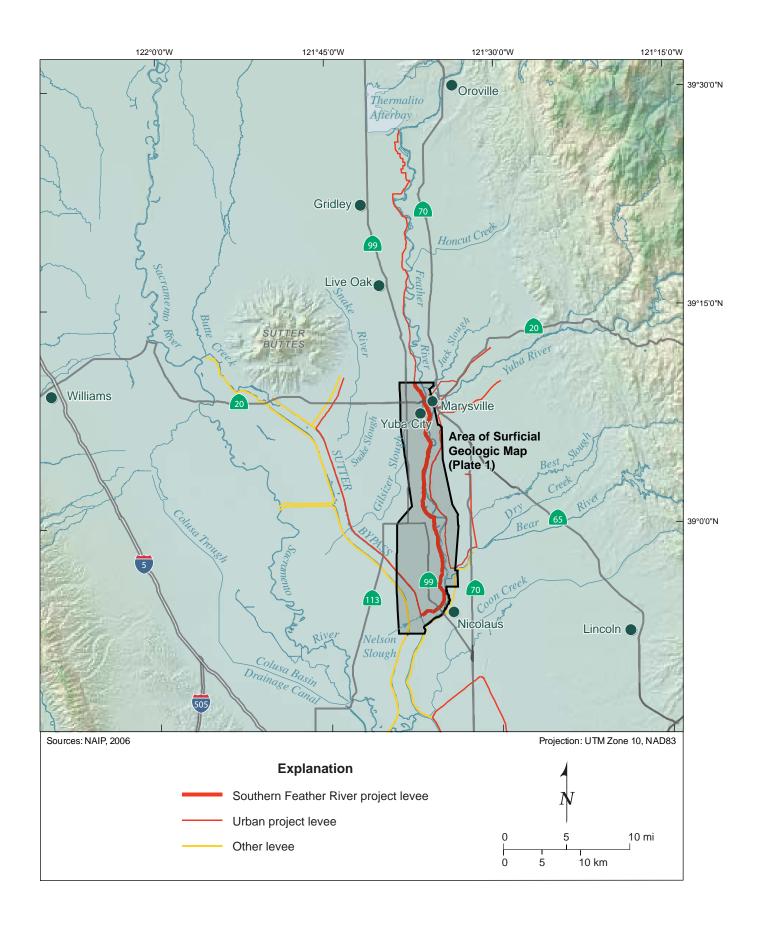


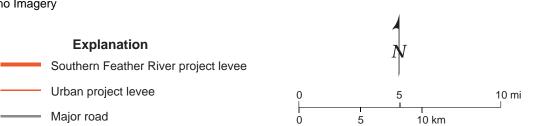
Figure 1



A. 1937 USDA Air Photo

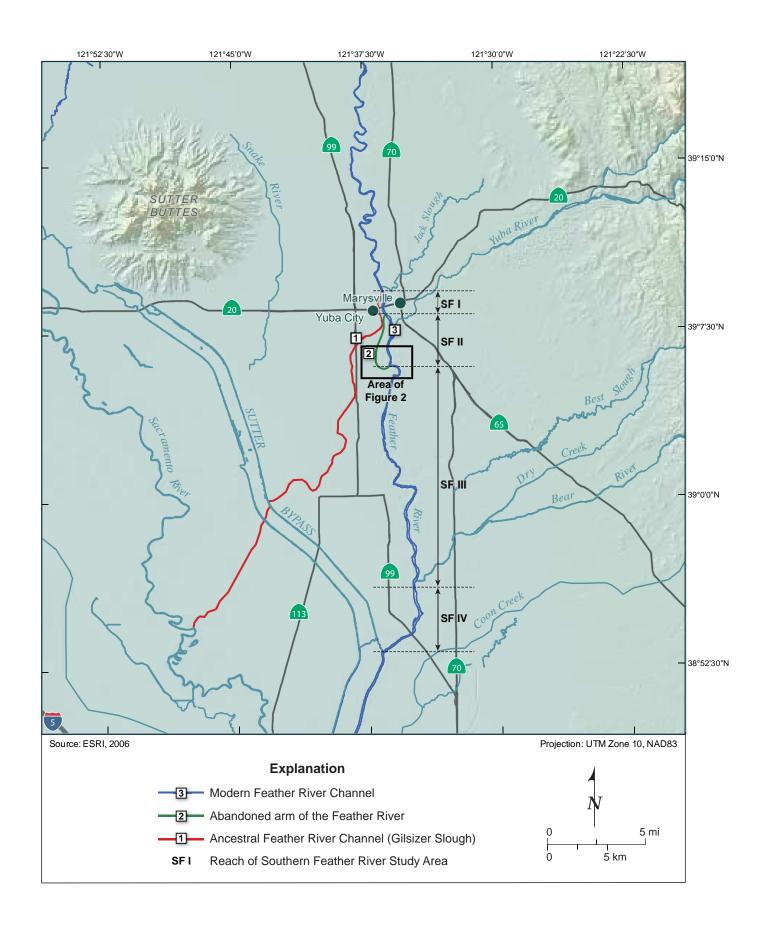


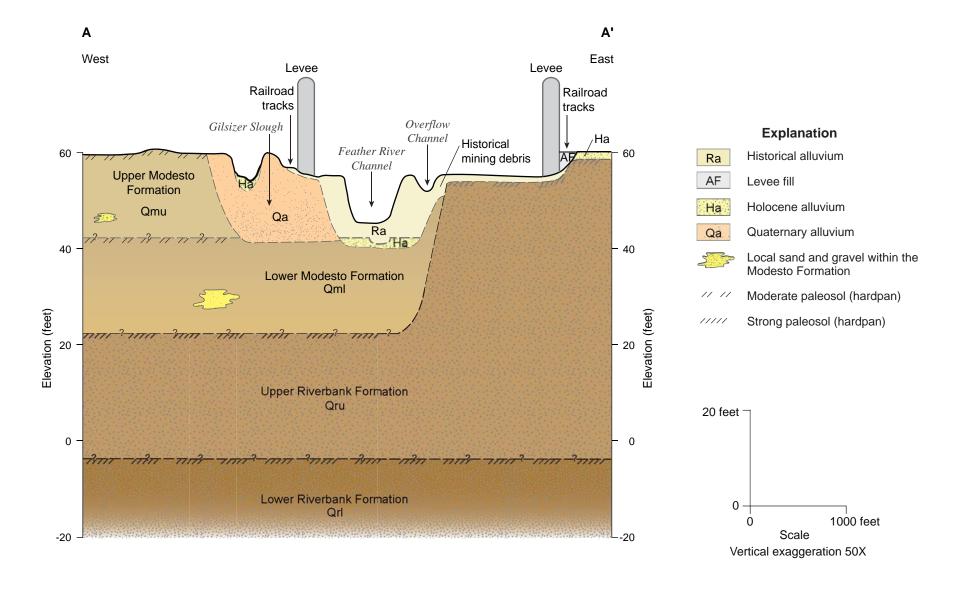
B. 2006 NAIP Ortho Imagery



DWR URBAN LEVEE PROJECT Figure 2

1881 South Feather River Modified 09.03.09





North South N52°W N30°W N68°W N29°W N22°W N31°W N46°W **←** WL001 WL001 WL001 WL001 WL001 07S 042C 041B 040C 06S Levee fill (AF) Silty Sand -20 -20 (Recent Overbank Deposits, Rob) Rob Rob Rob -40 Sandy silt with lenses of sand Depth below ground surface (feet) Upper Modesto Formation, Qmu) 17177 Sandy clay with lenses of silty sand (Lower Modesto Formation, Qml) -60 Silty sand to sandy silt Upper Riverbank Formation, Qru) -80 -80 -100 -100 Silty sand with pockets of gravel (Lower Riverbank Formation, Qrl)

B.O.H. 120 ft. B.O.H. 132.5 ft. B.O.H. 140 ft.

Explanation

Recent crevasse splay, surficial geologic map unit Rcs

Local sand and gravel within the Riverbank Formation

// // Moderate paleosol (hardpan)

//// Strong paleosol (hardpan)

N46°W Bend in Section

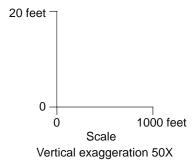
Notes: 1. See Plate 1 for location of cross section.

- 2. Surficial geologic units and contacts from this study and Helley and Harwood (1985).
- 3. Bottom of hole (BOH) values shown as total depth below ground surface.
- Borehole names and horizontal distance shown above from draft URS logs and location maps. Geologic relations could change if borehole locations revised
- 5. Drilling method indicated as last letter in borehole names:

S = Sonic Vibracore;

C = Cone Penetrometer Test;

B = Mud Rotary with SPT



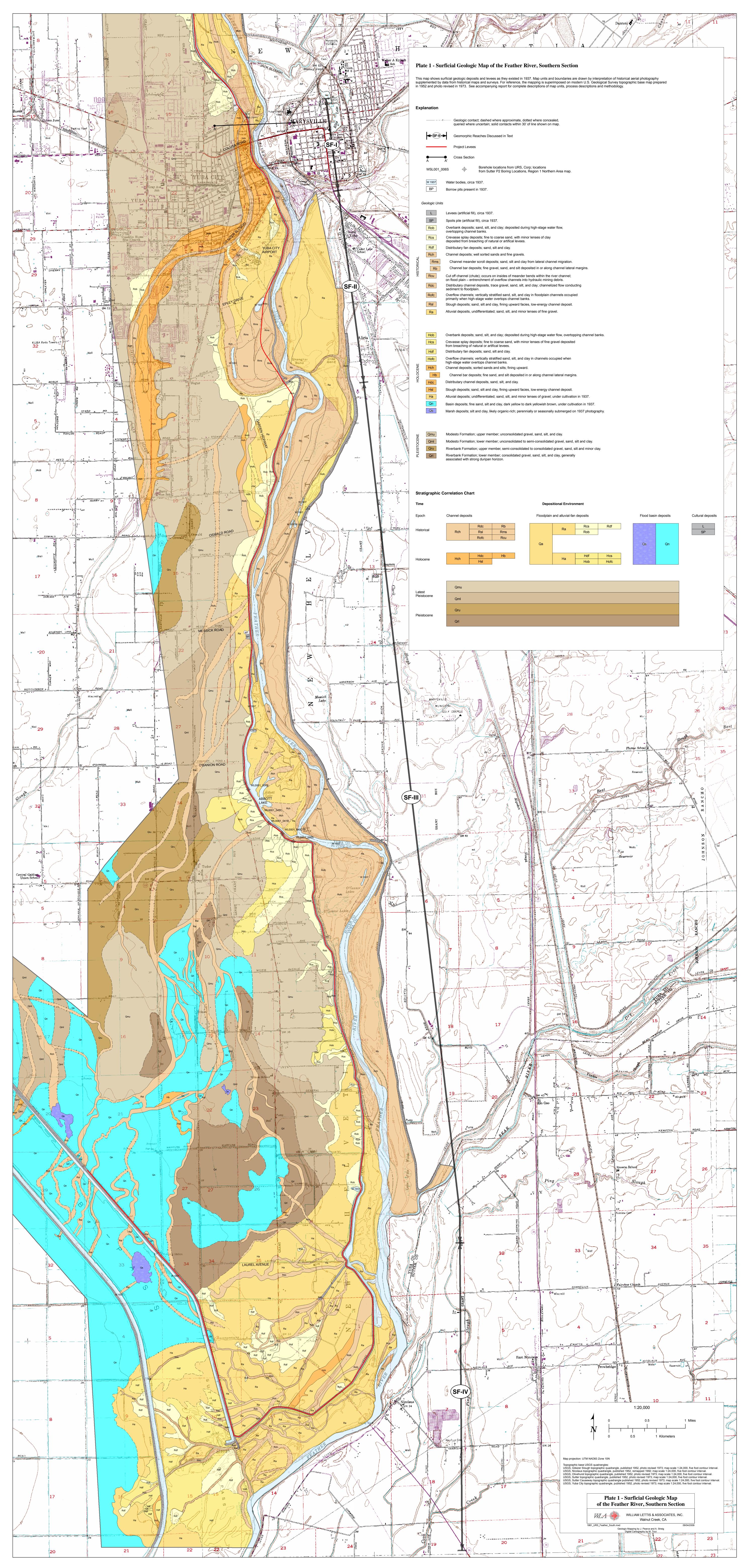
-120

B.O.H. 140 ft.

B.O.H. 140 ft.

-120

Figure 5



URS Supplemental Geotechnical Data Report (2010), Appendix O, Volume 5



Surficial Geologic Maps and Geomorphic Assessment of the Sutter Study Area, Urban Levee Geotechnical Evaluation, Sutter and Butte Counties, California

Prepared for:

URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento CA 94612

Prepared by:

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September 8, 2009



September 8, 2009

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Mr. Juan Vargas URS Corporation 2870 Gateway Oaks Drive, Suite 150 Sacramento, CA 95833

RE: Surficial geologic mapping and geomorphic assessment, California Department of Water Resources Urban Levees Project, Northern Feather River, Sutter County, California

Dear Mr. Vargas:

This letter presents the surficial geologic mapping and preliminary geomorphic assessment of the northern Feather River study area, for the California Department of Water Resources (DWR) Urban Levees Project geotechnical characterization. The goal of this mapping and geomorphic assessment is to provide information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees along the western bank of the Feather River between Thermalito Afterbay and Yuba City. The purpose of this study is to develop spatially continuous geologic map data and a conceptual model for stratigraphic interpretations between shallow boreholes. A primary goal is to provide a geologic framework for the geotechnical assessment of potential levee underseepage. This letter presents the technical approach, surficial geologic map, conceptual geomorphic model, and initial results based on map analysis and preliminary review of available Phase 1 geotechnical data.

We appreciated the opportunity to provide these geomorphic and geologic data and preliminary interpretations of the shallow stratigraphic conditions in the northern Feather River study area. Please do not hesitate to call any of the undersigned if there are any questions or comments.

Respectfully,

WILLIAM LETTIS & ASSOCIATES, INC.

Justin Pearce, C.E.G. 2421

Senior Geologist

Jutin Peace

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Senior Staff Geologist

Appley R. Strains

Keith Kelson, C.E.G. 1610

Will Helson

Principal Geologist



1.0 Introduction

This technical memorandum presents the results of surficial geologic mapping and geomorphic assessment along the north Feather River between Thermalito Afterbay and Yuba City, for the California Department of Water Resources Urban Levee program. The purpose of this study is to provide detailed information on the type and distribution of surface and shallow subsurface deposits that likely underlie the project levees, with respect to levee underseepage. This study involved integration and analysis of aerial photography, topographic, geologic, and soil maps, other historical documents, and review of readily available geotechnical exploration data. Synthesis of these data allowed us to assess the geomorphic processes responsible for the distribution of surficial deposits within the project area, and construct a preliminary conceptual model for stratigraphic interpretations. This technical memorandum is accompanied by the "Surficial Geologic Map of the Feather River, Northern Section".

1.1 Map and Report Preparation Quality Control

The surficial geologic map data and geomorphic interpretations presented in this memorandum were subject to quality control and quality assurance procedures as required by the Levee Geotechnical Evaluation Project Management Plan (PMP). The surficial geologic map data developed by this study were reviewed for accuracy and completeness through an internal review and an independent technical review by Dr. Janet Sowers of WLA. Results of QA/QC review were documented using PMP Exhibit 2.2-3 (Independent Technical Review Report) and are kept on file according filing control plan. Subsurface data shown on diagrams were provided as draft information, and were not verified for accuracy or completeness by this study.

2.0 Approach

The approach to developing a surficial geologic map of the northern Feather River project area (Figure 1, Plate 1) consisted of analysis of the following data:

- Aerial photography (black and white stereo-pairs taken in 1937, ~1:20,000-scale);
- early USGS topographic maps (i.e., 1911);
- published surficial geologic maps (Bussaca et al., 1989; Helley and Harwood, 1985; Creely, 1965);
- early and modern soil survey maps (Strahorn et al., 1909; Lytle, et al., 1988);
- other maps and documents (Page, 1985).

Synthesis of these data allow for the development of a detailed surficial geologic map that provides an initial understanding of primary geomorphic processes that have acted in the study area during recent and historical geologic time. Through this mapping, primary geomorphic features and associated surficial geologic deposits are identified, such as abandoned paleochannels, channel deposits, splay and overbank deposits and other deposits commonly associated with large active river systems. Knowledge of fluvial processes and the ability to recognize depositional environments in the geologic record are key to identifying locations along levees where underseepage is most likely to occur (Llopis et al., 2007).

2083 DWR Urban Levees 1 9/15/2009



The surficial geologic map was developed at the nominal scale of the aerial photography (1:20,000). This scale establishes the resolution of the map (Plate 1), such that display or analysis of the map data at a more detailed scale than 1:20,000 may introduce uncertainties beyond the original resolution of the data. The map unit boundaries shown on the surficial geologic map should be considered approximate, and accurate within 30 feet on either side of the line shown on the map. The 1937 aerial photographs are the primary data set for interpreting the surficial geologic deposits because: (1) they are the oldest high-quality images that pre-date much of the urbanization and landscape alteration within present-day Sutter and Butte Counties and, (2) these data represent a close approximation to the surficial deposits that were likely present at the ground surface prior to the construction of the levees. The 1937 photographs generally were taken in late summer or early autumn (i.e., August). By 1937, the area had experienced moderate cultivation that locally obscures geomorphic conditions. However, integration of data from the 1937 photography, old and recent topographic maps, geologic maps, soil surveys and historical documents provides sufficient information to delineate many of the pre-historical and historical surficial deposits in detail. Taken together, these data provide key insights to the characteristics of shallow deposits beneath the levees, as well as the geomorphic processes responsible for their distribution.

Additional floodplain deposition may have occurred after 1937, due to flood overflows, levee overtopping, or localized levee failure. A time series analysis that interprets successive aerial photographs taken after major flood events (i.e., USDA, black and white stereo-pairs taken in 1958, ~1:20,000-scale) or known local levee failures (i.e., 1986) may reveal additional information on surficial deposits in the northern Feather River area. Such analyses are beyond the scope of this study. The data and interpretations presented herein address the primary goal of characterizing the type and distribution of deposits likely present directly beneath the project levees that may be conducive to underseepage.

3.0 Geologic Setting

The northern Feather River study area lies in the central Sacramento Valley, between the Coast Ranges to the west and the Sierra Nevada foothills to the east. The Feather River drains the western slope of the Sierra Nevada, and emerges from the mountains south of Thermalito Afterbay (Figure 1). The river flows southward from Thermalito Afterbay, over middle –to late Pleistocene alluvium derived from the Sierra Nevada. The regional land surface is nearly flat, with a gentle west-southwest slope that flattens south of the Sutter Butte. The Feather River is entrenched into middle-to-late Pleistocene semi-consolidated sediments (i.e. Modesto Formation). Historical alluvium deposited by the Feather River is present between the modern levees, inset to the older geologic formations, and is present on the western floodplain as subdued natural levees that mantle the older geologic formations. In this study reach, west-flowing Honcut Creek is the only drainage tributary to the northern Feather River, with a confluence east of the town of Live Oak (Figure 1).

A primary influence on the historical processes in the river system was the hydraulic mining that began in the 1850's. Mining continued through the early 1900's in the Feather, Yuba and



Bear River watersheds, and abruptly introduced large quantities of sediment and drastically changed the geomorphic characteristics of these river systems (DWR, 2004; Ellis, 1939). Aggradation within the stream channels was a primary response to the introduction of substantial mining debris (James, 1999); consequently, post-1850 alluvial deposits are common throughout the study area.

4.0 Surficial Geologic Mapping

Previous geologic mapping along the northern Feather River and surrounding areas generalize the surficial deposits as: Quaternary alluvium (Qa) and Quaternary stream channel deposits (Qsc) are mapped within and proximal to the modern Feather River channel, (Bussaca et al., 1989; Helley and Harwood, 1985; Creely, 1965). These map units are considered Holocene in age (less than 11,000 years old). Late Pleistocene Modesto Formation (Qmu, Qml) is present as an escarpment along the western margin of the floodplain. These map units were delineated by Helley and Harwood (1985) at a regional scale (i.e., 1:62,500). The current analysis of the northern Feather River uses this geologic framework as a basis for more detailed mapping of Quaternary deposits and geomorphic features (Plate 1). The surficial geologic map units within the northern Feather River study area are described below, in order from oldest to youngest. Surficial geologic mapping for this study subdivides these general map units and delineates individual deposits based on relative age and depositional process or environment. The map units depicted on Plate 1 are primarily based on analysis of 1937 aerial photography, and thus the map essentially is a "snapshot" of geologic conditions at this time.

The oldest unit exposed along the Feather River is the lower member of the Riverbank Formation (Qrl) of Helley and Harwood (1985). The Riverbank Formation is a semiconsolidated, highly-dissected alluvial surface with textures of weathered gravel, sand and silt, and is associated with the presence of a well-developed hardpan (or, duripan) layer. This hardpan layer is a product of soil-forming processes over substantial geologic time, and reflects an ancient land surface that locally is buried by younger deposits. The Riverbank Formation is late to middle Pleistocene in age, and is estimated to be 130,000 to 450,000 yrs old (Helley and Harwood, 1985). The upper member (map unit Qru; Plate 1) is poorly consolidated dark brown to red alluvium consisting of gravel, sand, silt and minor clay (Busacca et al., 1989, Helley and Harwood, 1985). West of the Feather River, the Riverbank Formation is present near the town of East Biggs (Plate 1). Soils developed on the Riverbank formation are the Gridley clay loam and the Redding gravelly sandy loam (Carpenter et al., 1926).

The latest Pleistocene Modesto Formation is informally divided into two members: a lower (older) unit that is (about 29,000 to 49,000 years old), and consists of unconsolidated slightly weathered gravel, sand, silt and clay; and an upper member, a younger unit, that is about 12,000 to 26,000 years old (Helley and Harwood, 1985). The upper Modesto (map unit Qmu) consists of sand, silt, and some gravel, and is associated with a moderate amount of secondary (pedogenic) clay accumulation. This clay-rich horizon may form laterally continuous zones of low hydraulic conductivity, and may extend across boundaries between coarse and fine-grained strata within the latest Pleistocene alluvium. Soils developed on the Modesto Formation



include the Gridley loam of Strahorn et al. (1909) and the Conejo complex of Lytle et al. (1988), both of which are associated with a shallow "siltstone" horizon, or duripan (hardpan).

Latest Holocene deposits overlie or are inset into the Modesto Formation, and are categorized as channel, floodplain, and basin deposits (stratigraphic correlation chart; Plate 1). Channel deposits include Holocene channels (Hch), sloughs (Hsl), in-stream or lateral bars (Hb), and meander scrolls (Hms). These deposits likely consist of fine to coarse sand, silty sand, and clayey sand, with trace fine gravel. Holocene channel deposits (Hch) present along the western map area as secondary channels, contain fining-upward sequences of sand, silt and clay. These sloughs (map unit Hsl) are former channels associated with Live Oak and Morrison Sloughs (Plate 1), and are likely filled with a fining upward sequence of silt and clay.

Holocene floodplain deposits include crevasse splays (Hcs), and overbank deposits (Hob) and are typically deposited by non-channelized flow. Crevasse splays (Hcs) are from breaching of river banks or natural levees and are usually sand rich. Overbank deposits form by localized overtopping of river banks or natural levees, and subsequent deposition from shallow sheet flow or standing water.

Undifferentiated Holocene and Quaternary alluvium (Ha and Qa, respectively) usually occur proximal to or within the river channel, (Plate 1). The undifferentiated map unit is used in areas where geomorphic features are obscured or obliterated by historical (1937-era) agriculture. The deposits within these agriculturally modified areas are assigned a relative age (Ha or Qa) based on overlapping and cross cutting relationships with the surrounding deposits as follows: Ha if the agriculture-modified area is mapped within or shown overlying Holocene deposits; Qa where it is difficult to evaluate the age based on the relationship with nearby deposits. Soils associated with these undifferentiated units (Qa) are the Sacramento silt loam and Sacramento fine sandy loam, (Strahorn et al., 1909), and the Columbia fine sandy loam of Lyle et al. (1988), which are poorly-developed soils commonly associated with relatively young deposits (i.e. Shlemon, 1967).

Historical deposits mapped in the Northern Feather Study area include channel and floodplain deposits, as well as artificial fill deposits (Plate 1). Historical deposits are estimated to be less than about 150 years old, dating from approximately 1800 to 1937. Historical stream channels (Rch), and overflow channels (Rofc) transport high stage water flow across the ground surface outboard of the levees. These channel deposits likely consist of silt and sand with traces of gravel. The upper few feet of these deposits probably are filled with debris derived from upstream hydraulic mining activities. Lateral bar deposits (Rb) and meander scrolls (Rms) are located adjacent to the present-day Feather River, and are generally present inboard (waterside) of the present-day Feather River levees. In the northern part of the study area, directly south of Thermalito, are multiple anastomosing chutes (map unit Rcu; Plate 1). These chutes are similar to overflow channels in that they transport water flow during high river stage across the ground surface outboard of the levees. These chutes are entrenched into fluvially deposited hydraulic mining debris, and likely have filled with re-worked mining debris. Historical sloughs transport water collected from sheet flow and overland flow west of the Feather River southerly toward the Sutter Basin (i.e., Live Oak and Morrison Slough). Slough deposits (Rsl) likely consist of fining-upward silt and clay. Historical flood plain deposits include crevasse



splay (Rcs), and overbank (Rob) deposits, which generally consist of a gradational or abrupt fining upward sequence of sand, silt, and clay. Historical overbank (Rob) deposits are slightly finer grained sand, silt, and clay deposited via sheet flow. These historical deposits are differentiated from older deposits based on cross-cutting and superposition relationships relative to cultural features visible on the 1937 photographs.

Historical alluvial deposits (Ra), generally located between the Feather River channel levees, and on the land side of the levees in the area directly south of the Thermalito Afterbay, consist of undifferentiated sand, silt, and minor lenses of gravel. Soils associated with this sandy alluvium are the Columbia very fine sandy loam and Columbia loam, as shown on the Soil Survey Map of the Oroville Area (Carpenter et al., 1926). This series of soils has been correlated with Holocene age deposits by Shlemon (1967). Historical artificial fills are culturally-emplaced heterogeneous deposits, with varying amounts of clay, silt, sand, and gravel from local sources. These deposits include levee structures and canal levee systems (map unit L; Plate 1) and dredge tailings (map unit DT).

The distribution of historical and Holocene deposits shown on Plate 1 generally is consistent with early, less-detailed soil survey mapping along the western banks of the Feather River as areas of Marcuse clay loam, Gridley loam, Sacramento Series fine sand, sandy loam and silt loam and the Columbia very fine sandy loam soils (Strahorn et al., 1909; Carpenter et al., 1926). The Gridley loam occurs along the northern Feather River from the Thermalito Afterbay south to the confluence with the Bear River, and closely corresponds to the Modesto Formation of Helley and Harwood (1985). The relationship between the mapped surficial geologic units and the potential for underseepage is summarized below.

5.0 Geomorphic Conceptual Model

This section provides a preliminary geomorphic conceptual model based on general relationships among surface and subsurface geologic deposits along the western side of the Feather River, as described above and shown on Plate 1. This conceptual model provides a consistent basis for understanding the type and distribution surficial geologic deposits, primary geomorphic processes, and shallow subsurface stratigraphy in the study reach. This conceptual model does not address planform or gradient changes of the Feather River itself, nor the susceptibility of stream banks to erosion. Future studies of these changes would be valuable in understanding process response of the Feather River, and provide key data for estimating rates of channel changes (i.e. lateral migration). However, these analyses are not directly relevant to evaluating the possibility of underseepage with respect to levee stability.

Published geologic maps of the project area show a complex series of westward aggrading alluvial fans and terraces derived from erosion of the Sierra Nevada, identified as the Riverbank and Modesto Formations (Bussaca et al., 1989; Helley and Harwood, 1985; Creely, 1965). The Riverbank Formation and Modesto Formation in general are semi-consolidated to unconsolidated deposits characterized by intraformational paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. The oldest map unit, the Riverbank Formation unconformably overlies the Pliocene-Pleistocene



age Laguna Formation, which consists of interbedded alluvial gravel, sand and silt (Busacca et al., 1989; Helley and Harwood, 1985). The overlying Pleistocene Riverbank Formation consists of very dense gravel deposits that are, in turn, overlain by a medium dense sand and gravelly sand package of the latest Pleistocene Modesto Formation (Busacca et al., 1989). The upper member of the Modesto Formation is exposed at the ground surface adjacent to the western bank of the Feather River. The Modesto Formation is locally mantled by unconsolidated, sand rich Holocene deposits (Plate 1). East of the Feather River the older stratigraphic units are uplifted and dissected and younger deposits are inset into them with older deposits buried beneath younger deposits. West of the Feather River, the stratigraphic units are found in typical succession. This is the result of overall westward tilting and uplift of the Sierra Nevada, incision along the tributary drainages (i.e. Honcut creek), and progradational fan deposition west of the river.

Surficial geologic mapping (Plate 1) shows differences in deposit type and distribution from north to south along the northern Feather River study area, which are primarily associated with proximity to the Sierra Nevada mountain front near Thermalito Afterbay. These differences illustrate the diversity of past geomorphic processes along the river and, as a consequence, the type of geologic deposits at and near the ground surface. The surficial geologic map allows the delineation of reaches along the river within which geomorphic processes and their associated deposits appear to be relatively consistent.

The northern Feather River project area is divided into three reaches based on characteristic deposit types and distributions. The levee reaches are numbered Northern Feather one through three (NF-I through NF-III), sequentially from north to south (Figure 2, Plate 1). This section describes the surficial geologic characteristics of Reach NF-I, NF-II, and NF-III of the Feather River between Thermalito Afterbay and Yuba City.

5.1 Reach NF-I

Reach NF-I extends from the Thermalito Afterbay to Reimer Road and is about 11.1 levee miles long (Plate 1). Widespread deposits of historical alluvium (map unit Ra) blanket the area adjacent to the Feather River along the length of this reach where the river flows in the Sacramento Valley. Much of this unconsolidated historical alluvium contains clasts from many source lithologies and is derived from hydraulic mining debris (James, 1999). A complex pattern of anastomosing chutes or cut-off channels (map unit Rcu) eroded the historical alluvium by 1937 (Ra). These chutes underlie the project levees along the length of this reach (Plate 1). Project levees were built after 1937 along NF-I, from Thermalito Afterbay south to Ord Ranch Road.

Hardpan horizons were not identified in subsurface data along this reach, suggesting a substantial thickness of unconsolidated alluvial deposits unconformably overlying the Modesto Formation. Three alluvial units were identified in subsurface data overlying a semiconsolidated alluvial unit that we identified as the lower member of the Modesto Formation. Boreholes revealed an approximately 20-foot-thick package of young, unconsolidated silty sands and sandy clays, above a 10 to 16 foot thick silty sand, and 15-to 20-foot-thick gravel bed (Figure 3).



Hydraulic mining debris was dredged for its gold content along the northern half of the river banks along this reach, from Lapkin Road at Thermalito Afterbay to the area just south of Almond Avenue (Plate 1). Some dredge tailing spoils were apparent in 1937 aerial photography, though the majority of dredge tailing spoils post-date these air photos. The full extent of dredging tailing is apparent in modern USGS topographic maps (i.e. USGS, Biggs topographic quadrangle, 1:24,000 scale, 1970) and is shown on this surficial geologic map (map unit DT). Chutes (map unit Rcu) present in 1937 aerial images, though now obliterated by dredge operations are shown as dotted contacts in the Surficial Geologic Map (Plate 1). In this area project levees either overlie or bound the western edge of the Dredge Tailings (map unit DT). South of the dredged areas, the levee along Ord Ranch Road overlies deposits that fill an abandoned channel meander, map unit Hch (Plate 1). This abandoned meander matches the present river geometry and possibly reflects a southward migration of this meander within the active channel.

5.2 Reach NF-II

The second reach of the north Feather River project area, NF-II, extends from Reimer Road to Sanders Road, and has a length of about 9.4 levee miles. In this reach the project levee is typically perched at the top of a 5- to 15-foot-high east-facing escarpment cut into the Modesto Formation. The active meander belt of the Feather River with its flood plain, meander scrolls, and channel deposits, lies to the east of the levee at the base of the escarpment. West of the escarpment, historical overbank (Rob) and crevasse splay (Rcd) deposits locally overlie the Modesto. They represent locations where flooding of the Feather River overtopped the escarpment in the past and are assumed to pre-date the construction of the levee. An extensive continuous Holocene natural levee deposit has not built up along reach II, in contrast to reach I. The river may be incised too deeply below the surface of the Modesto Formation for floods to regularly overtop the escarpment.

Most of the Reach II levee sits directly on Modesto Formation with about 3.5 of the 9.4 miles of the levee sitting on the above-mentioned Holocene overbank and crevasse splay deposits that overlie Modesto Formation. Borehole WL0009_004S (Plate 1), located in the southern portion of this reach, shows project levee fill directly above the hard, consolidated Modesto Formation.

5.3 Reach NF-III

Levee reach NF-III extends from Sanders Road at the north to Yuba City at the south, and is about 4 miles in length (Plate 1). Along this reach the project levee almost entirely overlies Historical alluvial deposits that mantle, or crosscut the Modesto Formation. Crevasse splay (Rcs), overflow channels (Rofc), historical alluvium (Ra), channel deposits (Rch), and overbank deposits (Rob) are present along this reach. Crevasse splay deposits are present at the northern end of NF-III (Sanders Road, Plate 1), directly adjacent to a westerly bend of the Feather River. Aerial photography from 1937 shows multiple generations of crevasse splay deposits at this location. The levee appears to be constructed overtop these deposits. A pump station is noted on the 1970's topographic map, suggesting this location may have had seepage problems.



Immediately south of Sanders Road, an overflow channel (map unit Rofc) diverges from the Feather River, transporting flow outboard of the levees, and flowing back into the river about 1.5 miles south at Rednall Road (Plate 1). The overflow channel likely consists of a fining upward sequence of sand, silt, clay and some gravel, and could be slightly incised into the Modesto Formation. Undifferentiated historical alluvium (map unit Ra) underlies the levees within the area directly east of these overflow channels. This alluvium was laid down over the surface of the Modesto Formation by unchannelized flow of the Feather River (Plate 1). Historical channel deposits (map unit Rch) from the Feather River underlie about 0.7 miles of the levees north of Rednall Road (Plate 1). Overbank deposits are present near Pease Road (Plate 1) and continue along the levee for about 0.5 miles. Historical crevasse splay and overbank deposits likely consist of a massive to fining upward sequence of sand and silt derived from upstream hydraulic mining activities.

6.0 Applications to the Urban Levee Project

Based on an initial analysis of surface and subsurface geologic and geomorphic data, the levee bordering the western side of the Feather River from the Thermalito Afterbay to Yuba City, overlies three different types of deposits, Reach NF-I overlies a thick package of historical alluvium, NF-II directly overlies the Modesto Formation with local areas of historical alluvium, and Reach NF-III directly overlies a continuous blanket of sediment derived from historical crevasse splay (Rcs), overflow channel (Rofc), alluvium (Ra), channel (Rch) and overbank (Rob) deposits, above the Modesto Formation. The preliminary conceptual surface and subsurface geologic relationships as they relate to levee structures and potential underseepage along each reach of the river are described below. This study does not account for any existing seepage mitigation structures (i.e. cutoff walls) that may be present.

Along Reach NF-I the levees are underlain by a package of young coarse-grained fluvial sediment, most likely of mining debris origin, and chutes filled with coarse grained fining upward sequences of sediment also derived from hydraulic mining debris (Figure 3). This material is laterally extensive and poorly consolidated, with localized chute deposits (map unit Rcu). The chutes extend beneath the levee with an orientation that is roughly orthogonal to the levee crest, and may provide relatively high conductivity pathways for levee underseepage within the already very permeable fluvial sediments. The sediments along the northern half of reach NF-I were dredged for gold during the first half of the 20th century, well-graded dredge tailings remain in these areas. Dredge tailings are unconsolidated and consist of silt, sand, and gravel. At the north near Vance Avenue the project levees appear to overlie these highly permeable tailings, and everywhere else bound the western edge of the tailing spoils. Levees along this entire reach are judged to be highly susceptible to underseepage.

Levee reach NF-II is likely underlain by a combination of coarse grained, semi-consolidated alluvium of the Modesto Formation and localized areas of historical, poorly consolidated coarse-grained avulsion deposits (overbank and crevasse splay deposits) overlying the Modesto Formation. These avulsion deposits likely are permeable and may provide localized areas susceptible to underseepage. Project levees underlain by the Modesto Formation likely are less



susceptible to underseepage problems, however the natural variability within the Modesto may also provide local pathways for underseepage.

Levee reach NF-III generally consists of westward aggrading avulsion deposits overlying the Modesto Formation. The levee is underlain by coarse-grained, poorly consolidated silt, sand and gravel, blanketing the consolidated Modesto Formation and in some places incised into the Modesto Formation. These deposits likely are permeable and susceptible to underseepage.

In summary, lateral and vertical variabilities in the shallow subsurface deposits have resulted from past fluvial geomorphic processes. Surficial geologic mapping along the north Feather River allows reach classifications within which conditions may be relatively similar. The conceptual geomorphic framework suggests that stratigraphic relationships may promote localized levee underseepage, given certain hydraulic conditions throughout the Northern Feather River Study area, particularly along reach NF-I. Areas where levees may overlie historical or Holocene-age coarse grained deposits are of special concern. Further spatial analyses of the surficial geologic mapping and subsurface geotechnical exploration data are needed to better constrain and characterize areas that are most susceptible to underseepage in the study area. We anticipate that this conceptual model will be revised and updated as new information becomes available.

7.0 Limitations

This geomorphic assessment and associated data interpretation have been performed in accordance with the standard of care commonly used as the state-of-practice in the geologic engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this geographic area performing the same services under similar circumstances during the same time period.

Discussions of surface and subsurface conditions summarized in this technical memorandum are based on geologic interpretations of subsurface soil data at limited exploration locations available to this assessment through September of 2007. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able to identify all adverse conditions in the levee and its foundation. This memorandum is for the use and benefit of DWR. Use by any other party is at their own discretion and risk.

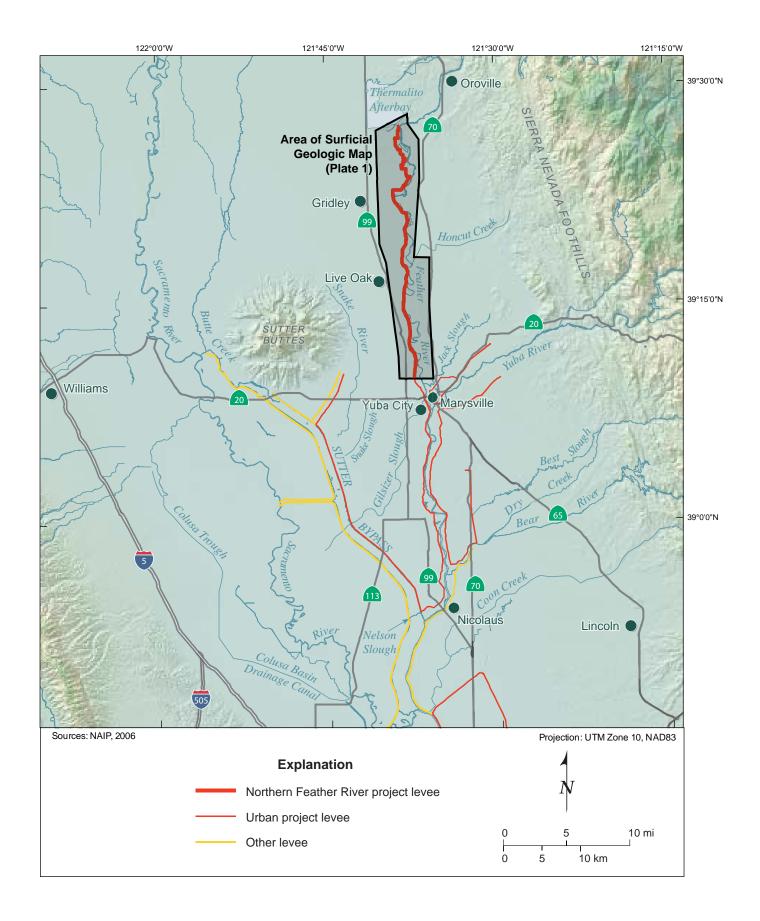


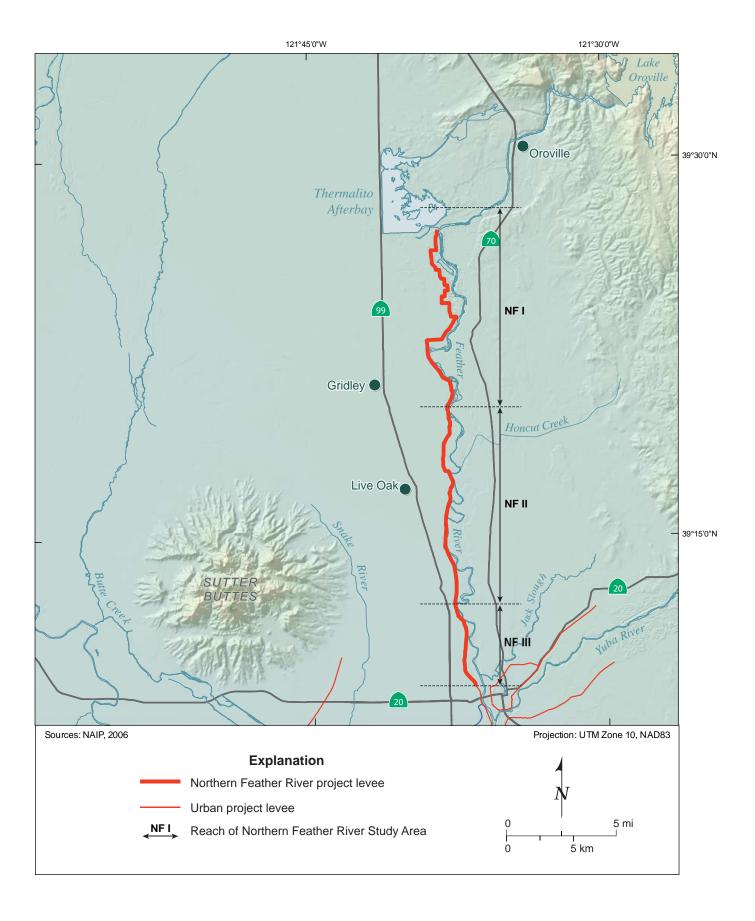
8.0 References

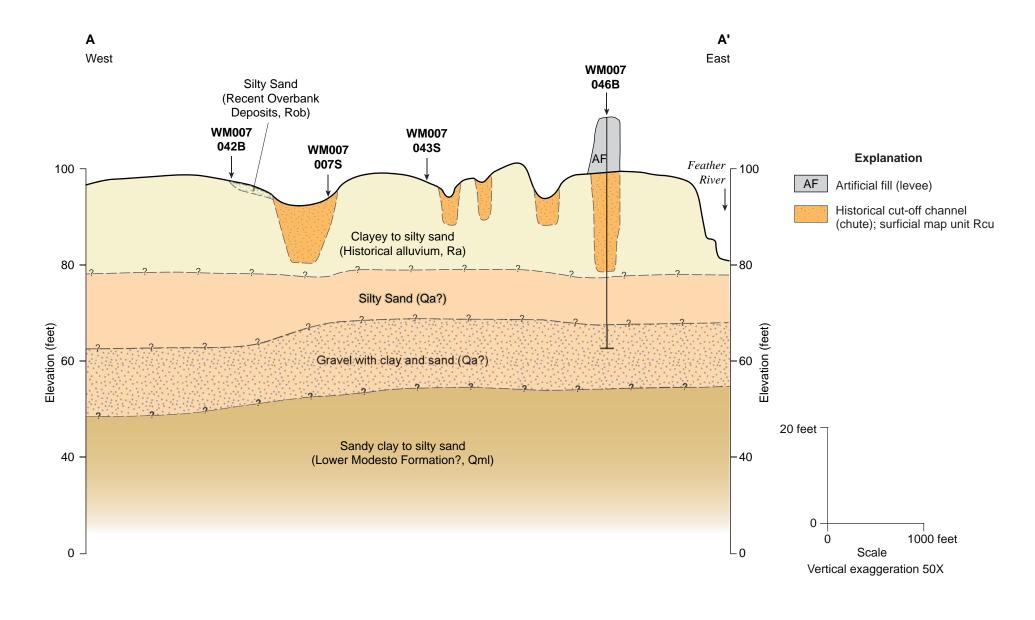
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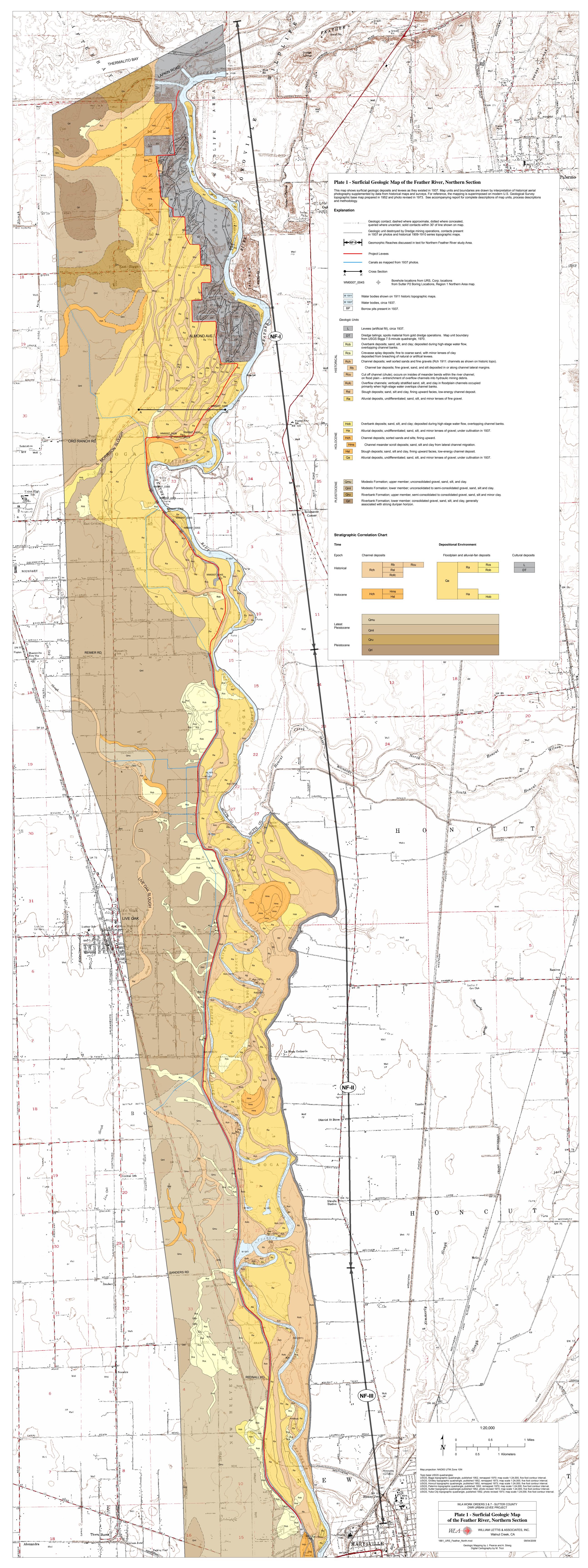


- USGS, Biggs topographic quadrangle, surveyed 1909-1910, published 1912; map scale 1:31,680, five foot contour interval.
- USGS, Gridley topographic quadrangle, surveyed 1909-1910, published 1912; map scale 1:31,680, five foot contour interval.
- USGS, Honcut topographic quadrangle, surveyed 1909-1910, published 1912; map scale 1:31,680, five foot contour interval.
- USGS, Oroville topographic quadrangle, surveyed 1910, published 1912; map scale 1:31,680, five foot contour interval.
- USGS, Palermo topographic quadrangle, surveyed 1910, published 1912; map scale 1:31,680, five foot contour interval.
- USGS, Sutter topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
- USGS, Yuba City topographic quadrangle, surveyed 1909, published 1911; map scale 1:31,680, five foot contour interval.
- USGS, Biggs topographic quadrangle, published 1952, remapped 1970; map scale 1:24,000, five foot contour interval.
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- USGS, Oroville topographic quadrangle published 1952, photo revised 1973; map scale 1:24,000, five foot contour interval.
- USGS, Palermo topographic quadrangle published 1952, remapped 1970; map scale 1:24,000, five foot contour interval.
- USGS, Sutter topographic quadrangle, published 1952, photo revised 1973; map scale 1:24,000, five foot contour interval.
- USGS, Yuba City topographic quadrangle, published 1952, photo revised 1973; map scale 1:24,000, five foot contour interval.









Appendix D

Air Quality General Conformity Determination, Calculation Spreadsheets and Supporting Information

General Conformity Determination

A.1 Introduction

This appendix provides the general conformity determination for the Feather River West Levee Project (FRWLP, or project). A general conformity determination is required by Section 176 of the Clean Air Act (CAA). The CAA requires states to submit a state implementation plan (SIP) for areas in nonattainment for Federal standards. Section 176(c)(1) of the CAA prohibits Federal agencies from engaging in, supporting, or providing financial assistance for licensing, permitting, or approving any activities that do not conform to an approved SIP.

The U.S. Environmental Protection Agency (EPA) enacted the Federal general conformity regulation in 1993 (40 Code of Federal Regulations [CFR] Parts 5, 51, and 93). The purpose of the general conformity rule is to ensure that Federal actions do not generate emissions that interfere with state and local agencies' SIPs and emission-reduction strategies to ensure attainment of the national ambient air quality standards (NAAQS). Specifically, projects that receive Federal funding or require Federal approval must demonstrate that they would not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions toward attainment. Because the project is receiving Federal funds and approvals from the U.S. Army Corps of Engineers (USACE), all direct and indirect emissions generated by the project are subject to the general conformity rule.

A.1.1 Regulatory Status of the Study Area

The study area is subject to air quality regulations developed and implemented at the Federal, state, and local levels. At the Federal level, the EPA is responsible for implementation of the CAA. Some portions of the CAA (e.g., certain mobile-source and other requirements) are implemented directly by EPA. Other portions of the CAA (e.g., stationary-source requirements) are implemented by state and local agencies.

Responsibility for attaining and maintaining air quality in California is divided between the California Air Resources Board (ARB) and regional air quality districts. Within the study area, the Feather River Air Quality Management District (FRAQMD) has jurisdiction over local air quality in Sutter County, and the Butte County Air Quality Management District (BCAQMD) has jurisdiction over local air quality in Butte County.

Under the CAA, FRAQMD and BCAQMD are required to develop air quality plans for nonattainment criteria pollutants in their respective air districts. The 1994 Sacramento Area Regional Ozone Attainment Plan was prepared to address VOC and NO_X emissions following the region's serious nonattainment designation for the 1-hour ozone (O_3) NAAQS in November 1991. The Sacramento Regional 8-Hour Attainment and Reasonable Further Progress Plan has also been adopted to address the region's nonattainment status for the 8-hour O_3 NAAQS. Air districts within the Sacramento Federal Nonattainment Area (SFNA) have submitted the O_3 plan to the EPA and are currently waiting for the agency to approve the document. Counties in the SFNA (Sacramento, Yolo, Placer, El Dorado, Solano, Sutter, and Butte) have also adopted the Northern Sacramento Valley

Planning Area 2009 Triennial Air Quality Attainment Plan (2009 Plan) (Sacramento Valley Air Quality Engineering and Enforcement Professionals 2010). This plan outlines strategies to achieve the health-based O_3 standard. The Sacramento region is also in the process of developing a plan to address particulate matter (PM).

A.1.2 General Conformity Requirements

The general conformity rule applies to all Federal actions located in nonattainment and maintenance areas that are not exempt from general conformity (are either covered by Transportation Conformity or listed in the rule), are not covered by a presumed-to-conform approved list¹, or do not have clearly *de minimis* emissions. In addition, the general conformity rule applies only to direct and indirect emissions associated with the portions of any Federal action that are subject to New Source Review (i.e., do not include stationary industrial sources requiring air quality permits from local air pollution control agencies) for which a Federal permitting agency has directly caused or initiated, has continued program responsibility for, or can practically control.

Federal projects must undertake an evaluation to determine whether all project emission sources are subject to the general conformity rule. The analysis includes a stepwise process in which the Federal agency determines the following.

- 1. **Is the project located in a Federal attainment area?** If yes, the project is not subject to general conformity and no future analysis is required. If no, document whether the project is located in a nonattainment or maintenance area and proceed to step 2.
- 2. **Does one or more of the specific exemptions apply to the project?** If yes, the project is exempt from general conformity and no further analysis is required. If no, proceed to step 3.
- 3. **Has the Federal agency included the action on its list of presumed-to-conform actions?** If yes, the project is presumed to conform to the applicable SIP and the requirements of general conformity are satisfied. If no, proceed to step 4.
- 4. **Are the total direct and indirect emissions below the** *de minis* **thresholds?** If yes, the project would not cause or contribute to new violations of air quality standards; the requirements of general conformity are satisfied. If no, the applicant must perform a conformity determination.

A general conformity determination is made by satisfying any of the following requirements.

- Showing that the emission increases caused by the Federal action are included in the SIP.
- Demonstrating that the state agrees to include the emission increases in the SIP.
- Offsetting the action's emissions in the same or nearby area.
- Mitigating to reduce the emission increase.
- Utilizing a combination of the above strategies.

The general conformity rule states that the applicability analysis can be (but is not required to be) completed concurrently with any analysis required under the National Environmental Policy Act

¹ Category of activities designated by a Federal agency as having emissions below *de minimis* levels or otherwise do not interfere with the applicable SIP or the attainment and maintenance of the NAAQS.

(NEPA). The applicability analysis for the proposed project is described in Section A.8, *Applicability Analysis*.

A.2 Description of the Federal Action

The Federal lead agency is only required to conduct a general conformity evaluation for the specific Federal action associated with the selected alternative for a project or program (U.S. Environmental Project Agency 1994). The positive conformity determination must be submitted before the Federal action is approved. Each Federal agency is responsible for determining conformity of those proposed actions over which it has jurisdiction. Alternative 3 has been selected as the applicant-preferred alternative (APA). However, air quality modeling presented in the EIR/EIS indicates that Alternative 3 would not generate criteria pollutant emissions in excess of applicable *de minimis* thresholds. Accordingly, a general conformity determination for the APA is not required.

The general conformity determination presented in this appendix is related only to those activities included in the USACE's action pertaining to Alternative 2. As discussed in the EIR/EIS, Alternative 2 is the only project alternative that would exceed *de minimis* thresholds. Although Alternative 2 has not been identified as the APA, this general conformity determination is being issued in the event the project proponents should select Alternative 2 as the APA before finalization of the EIR/EIS. The project is described further in Section A.3 below.

A.3 Feather River West Levee Project

The primary purpose of the FRWLP is to reduce flood risk for the entire planning area by addressing known levee deficiencies along the Feather River West Levee from Thermalito Afterbay downstream to approximately 4 miles upstream of the confluence with the Sutter Bypass. Alternative 2 includes measures which would not be constrained by the existing footprint of the Feather River West Levee. Advantages of an alternative formulated on this basis are that it may more effectively address the deficiency or may be less in cost compared to measures within the levee footprint. This alternative primarily proposes stability berms and seepage berms (along with other measures), which would substantially extend beyond the current levee footprint.

A.4 Air Quality Conditions in the Study Area

The project area is in Butte and Sutter Counties, which are located in the Sacramento Valley Air Basin (SVAB). The SVAB is bounded on the north by the Cascade Range, on the south by the San Joaquin Valley Air Basin, on the east by the Sierra Nevada, and on the west by the Coast Ranges.

A.4.1 Climate and Meteorology

The SVAB has a mediterranean climate characterized by hot, dry summers and cool, rainy winters. During winter, the North Pacific storm track intermittently dominates Sacramento Valley weather, and fair weather alternates with periods of extensive clouds and precipitation. Periods of dense and persistent low-level fog, which are most prevalent between storms, are also characteristic of winter weather in the valley. The frequency and persistence of heavy fog in the valley diminish with the

approach of spring. The average yearly temperature range for the Sacramento Valley is 20°F to 115°F, with summer high temperatures often exceeding 90°F and winter low temperatures occasionally dropping below freezing.

In general, the prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells collect over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduce the influx of outside air and allow air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with temperature inversions that trap pollutants near the ground.

The O_3 season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the *Schultz Eddy* prevents this from occurring. Instead of allowing the prevailing wind patterns to move north carrying the pollutants out, the Schultz Eddy causes the wind pattern to circle back to the south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento Valley and Yolo County. This phenomenon has the effect of exacerbating the pollution levels in the area and increases the likelihood of violating Federal or state standards. The eddy normally dissipates around noon when the Delta sea breeze arrives (Sacramento Metropolitan Air Quality Management District 2009:1-7).

A.4.2 Ambient Air Quality

The existing air quality conditions in the project area can also be characterized by monitoring data collected in the region. The air quality monitoring station in Sutter County nearest to the project area is the Yuba City-Almond Street station, which is 1.5 miles from the levee in Yuba City. The nearest monitoring station in Butte County is the Gridley station, 2 miles west of the levee in Gridley. The Gridley station monitors only for exceedances of the state 1-hour O_3 standard. The next closest monitoring station in Butte County that measures all criteria pollutants is the Chico station, which is 25 miles from the northern boundary of the project site.

Table 1 summarizes air quality monitoring data from the Yuba City and Gridley monitoring stations for the last 3 years for which complete data are available (2007–2009). As shown in Table 1, both stations have experienced occasional violations of the state 1-hour O_3 and PM10 standards, and more frequent violations of the Federal PM2.5 and state 8-hour O_3 standards.

Table 1. Ambient Air Quality Monitoring Data Measured at the Yuba City and Gridley Monitoring Stations

		Yuba City	,		Gridley	
Pollutant Standards	2007	2008	2009	2007	2008	2009
1-hour O ₃ (ppm)						
Maximum 1-hour concentration	0.095	0.092	0.089	0.94	0.111	0.08
1-hour California designation value	0.09	0.09	0.09	0.09	0.09	0.09
1-hour expected peak day concentration	0.090	0.091	0.087	0.090	0.094	0.08
Number of days standard exceeded ^a						
CAAQS 1-hour (>0.09 ppm)	1	0	0	0	2	0
8-hour O ₃ (ppm)						
National maximum 8-hour concentration	0.081	0.080	0.076	0.084	0.096	0.07
National second-highest 8-hour concentration	0.078	0.075	0.067	0.080	0.084	0.07
State maximum 8-hour concentration	0.082	0.080	0.077	0.084	0.097	0.07
State second-highest 8-hour concentration	0.078	0.075	0.068	0.080	0.084	0.07
8-hour national designation value	0.074	0.072	0.068	0.074	0.076	0.07
8-hour California designation value	0.082	0.082	0.080	0.084	0.084	0.08
8-hour expected peak day concentration	0.086	0.086	0.080	0.084	0.085	0.08
Number of days standard exceededa						
NAAQS 8-hour (>0.075 ppm)	3	1	1	3	6	0
CAAQS 8-hour (>0.070 ppm)	6	2	1	10	14	2
Carbon monoxide (ppm)						
National ^b maximum 8-hour concentration	_	-	-	2.16	2.74	2.35
National ^b second-highest 8-hour concentration	-	-	-	2.16	2.39	1.99
California ^c maximum 8-hour concentration	_	-	-	2.16	2.74	2.35
California ^c second-highest 8-hour concentration	-	-	-	2.16	2.39	1.99
Maximum 1-hour concentration	-	-	-	3.3	3.1	-
Second-highest 1-hour concentration	-	-	-	2.8	3.0	-
Number of days standard exceededa						
NAAQS 8-hour (≥9.0 ppm)	-	-	-	0	0	-
CAAQS 8-hour (≥9.0 ppm)	-	-	-	0	0	-
NAAQS 1-hour (≥35.0 ppm)	-	-	-	0	0	-
CAAQS 1-hour (≥20.0 ppm)	-	-	-	0	0	-
Particulate matter (PM10)d (μg/m³)						
National ^b maximum 24-hour concentration	51.0	66.9	50.7	61.9	143.5	48.2
National ^b second-highest 24-hour concentration	42.4	55.6	49.8	61.0	112.4	43.4
State ^c maximum 24-hour concentration	54.0	66.9	50.1	66.1	140.8	47.7
State ^c second-highest 24-hour concentration	45.6	57.0	49.1	65.0	111.6	45.9
State annual average concentration ^e	-	_	22.4	21.7	27.6	20.1
National annual average concentration	19.7	24.4	22.2	21.3	27.3	19.5

		Yuba City	7		Gridley	
Pollutant Standards	2007	2008	2009	2007	2008	2009
Number of days standard exceeded ^a						
NAAQS 24-hour (>150 μ g/m³) ^f	0	0	0	0	0	0
CAAQS 24-hour (>50 µg/m³)f	1	4	0	2	6	0
Particulate matter (PM2.5) (μg/m³)						
National ^b maximum 24-hour concentration	45.0	127.3	41.8	53.9	107.6	35.1
National ^b second-highest 24-hour concentration	42.0	105.5	36.3	53.0	93.8	30.0
State ^c maximum 24-hour concentration	55.8	147.1	45.3	83.7	190.9	59.2
State ^c second-highest 24-hour concentration	52.7	124.6	44.0	70.2	180.1	54.2
National annual designation value	9.7	10.1	8.9	12.1	13.4	12.4
National annual average concentration	8.1	10.6	7.9	10.6	16.4	10.0
State annual designation value	11	15	15	15	18	18
State annual average concentration ^e	-	14.7	12.2	14.4	18.2	13.0
Number of days standard exceeded ^a						
NAAQS 24-hour (>35 μg/m ³) ^f	8	10	2	24	37	0

Sources: California Air Resources Board 2011; U.S. Environmental Protection Agency 2009.

 $\mu g/m^3$ = micrograms per cubic meter.

CAAQS = California ambient air quality standards.

NAAQS = national ambient air quality standards.

ppm = parts per million.

- = insufficient data available to determine the value.

Notes:

A.4.3 Mass Emissions

The ARB compiles an emissions inventory for all sources of emissions within Butte and Sutter Counties. This inventory is used by the FRAQMD, BCAQMD, and ARB for regional air quality planning purposes and is the basis for the region's air quality plans, and includes such sources as stationary (e.g., landfills, electric utilities, mineral processes); area-wide (e.g., farming operations, construction/demolition activities, residential fuel combustion); and mobile sources (e.g., automobiles, aircraft, off-road equipment). Current emissions of criteria pollutants for 2008 (the most recent year for which inventory data are available) for Butte and Sutter Counties are summarized in Table 2 and 3, respectively.

^a An exceedance is not necessarily a violation.

^b National statistics are based on standard conditions data. In addition, national statistics are based on samplers using Federal reference or equivalent methods.

^c State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California approved samplers.

^d Measurements usually are collected every 6 days.

^e State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

^f Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

Table 2. Butte County Air Quality Emissions—2008

		Annual er	nissions (to	ns per day)			
Source type	Subcategory	ROG	CO	NO _X	SO_X	PM10	PM2.5
Stationary source	es						
Fuel combustion							
Stationary	Electric utilities	0.02	4.97	0.42	0	0.17	0.15
Stationary	Cogeneration	0	0	0	0	0	0
Stationary	Manufacturing and industrial	0.01	0.06	0.28	0.01	0.01	0.01
Stationary	Food and agricultural processing	0.09	0.41	1.01	0.01	0.06	0.06
Stationary	Service and commercial	0.02	0.07	0.37	0	0.01	0.01
Stationary	Other (fuel combustion)	0.04	0.14	0.13	0	0.03	0.03
Total fuel combust	ion	0.18	5.65	2.21	0.02	0.28	0.26
Waste disposal							
Stationary	Sewage treatment	0	0	0	0	0	0
Stationary	Incinerators	0	0	0.01	0	0	0
Stationary	Other (waste disposal)	0	0	0	0	0	0
Total waste dispos	al	0	0	0.01	0	0	0
Cleaning and surfa	ice coatings						
Stationary	Laundering	0	0	0	0	0	0
Stationary	Degreasing	0.45	0	0	0	0	0
Stationary	Coatings and related process solvents	0.31	0.04	0.01	0	0	0
Stationary	Printing	0.01	0	0	0	0	0
Stationary	Adhesives and sealants	0.1	0	0	0	0	0
Total cleaning and	surface coatings	0.87	0.04	0.01	0	0	0
Petroleum produc	tion and marketing						
Stationary	Oil and gas production	0.1	0.02	0.02	0	0	0
Stationary	Petroleum marketing	0.76	0	0	0	0	0
Total petroleum pr	oduction and marketing	0.86	0.02	0.02	0	0	0
Industrial process	es						
Stationary	Chemical	0	0	0	0	0	0

		Annual e	missions (to	ns per day)			
Source type	Subcategory	ROG	СО	NO _X	SO_X	PM10	PM2.5
Stationary	Food and agriculture	0.03	0	0	0	1.53	0.7
Stationary	Mineral processes	0.01	0.01	0.01	0.01	0.58	0.15
Stationary	Metal processes	0	0	0	0	0	0
Stationary	Wood and paper	0.14	0	0.01	0	1.79	1.07
Stationary	Other (industrial processes)	0.15	0	0	0	0	0
Total industrial processes	s	0.33	0.01	0.02	0.01	3.9	1.92
Total stationary source	al stationary sources 2.24 5.72 2.27 0.03 4.18						
Area-wide sources							
Solvent evaporation				-			
Area-wide	Consumer products	1.44	0	0	0	0	0
Area-wide	Architectural coatings and related process solvents	0.62	0	0	0	0	0
Area-wide	Pesticides/fertilizers	0.61	0	0	0	0	0
Area-wide	Asphalt paving/roofing	2.83	0	0	0	0	0
Total solvent evaporation	18.71	0.00	0.00	0.00	0.01	0.01	
Miscellaneous processes							
Area-wide	Residential fuel combustion	1.27	18.13	0.67	0.05	2.74	2.64
Area-wide	Farming operations	0.38	0	0	0	5.35	8.0
Area-wide	Construction and demolition	0	0	0	0	1.09	0.11
Area-wide	Paved road dust	0	0	0	0	3.71	0.56
Area-wide	Unpaved road dust	0	0	0	0	7.62	0.76
Area-wide	Fugitive windblown dust	0	0	0	0	0.26	0.04
Area-wide	Fires	0.01	0.12	0	0	0.01	0.01
Area-wide	Managed burning and disposal	1.02	11.63	0.66	0.02	1.48	1.39
Area-wide	Cooking	0.04	0	0	0	0.11	0.07
Total miscellaneous proc	esses	2.72	29.88	1.33	0.07	22.37	6.38
Total area-wide source	S	10.46	35.6	3.6	0.1	26.55	8.56
Mobile sources							
On road mobile sources	₩						
Mobile	Light duty passenger (LDA)	1.91	16.37	1.43	0.01	0.08	0.04

		Annual er	nissions (tor	ns per day)			
Source type	Subcategory	ROG	СО	NO_X	SO_X	PM10	PM2.5
Mobile	Light duty trucks - 1 (LDT1)	1.4	13.54	1.26	0.01	0.05	0.03
Mobile	Light duty trucks - 2 (LDT2)	1.01	9.89	1.23	0.01	0.06	0.04
Mobile	Medium duty trucks (MDV)	0.4	4.47	0.59	0	0.02	0.02
Mobile	Light heavy duty gas trucks - 1 (LHDV1)	0.18	1.36	0.19	0	0	0
Mobile	Light heavy duty gas trucks - 2 (LHDV2)	0.1	0.74	0.08	0	0	0
Mobile	Medium heavy duty gas trucks (MHDV)	0.24	1.9	0.13	0	0	0
Mobile	Heavy heavy duty gas trucks (HHDV)	0.08	1.12	0.12	0	0	0
Mobile	Light heavy duty diesel trucks - 1 (LHDV1)	0.01	0.07	0.32	0	0.01	0
Mobile	Light heavy duty diesel trucks - 2 (LHDV2)	0.01	0.04	0.2	0	0	0
Mobile	Medium heavy duty diesel trucks (MHDV)	0.02	0.16	0.74	0	0.02	0.02
Mobile	Heavy heavy duty diesel trucks (HHDV)	0.48	1.96	7.1	0.01	0.29	0.25
Mobile	Motorcycles (MCY)	0.36	2.73	0.09	0	0	0
Mobile	Heavy duty diesel urban buses (UB)	0	0.01	0.05	0	0	0
Mobile	Heavy duty gas urban buses (UB)	0	0.03	0.01	0	0	0
Mobile	School buses (SB)	0.01	0.1	0.1	0	0	0
Mobile	Other buses (OB)	0.02	0.26	0.05	0	0	0
Mobile	Motor homes (MH)	0.04	0.92	0.11	0	0	0
Total on road mobile se	ources	6.27	55.67	13.8	0.04	0.53	0.4
Other mobile sources							
Mobile	Aircraft	0.51	4.78	0.26	0.05	0.02	0.02
Mobile	Trains	0.16	0.5	2.32	0.02	0.07	0.06
Mobile	Recreational boats	1.49	5.28	0.26	0	0.1	0.08
Mobile	Off-road recreational vehicles	0.33	1.06	0.01	0	0	0
Mobile	Off-road equipment	1.22	9.04	2.7	0	0.18	0.16
Mobile	Farm equipment	0.52	2.78	2.56	0	0.15	0.14
Mobile	Fuel storage and handling	0.14	0	0	0	0	0
Total off road mobile s	ources	4.37	23.44	8.11	0.07	0.52	0.46
Total mobile sources	<i>ral mobile sources</i> 10.64 79.11 21.91 0.11 1.05						0.86
Butte County total		23.34	120.43	27.78	0.24	31.78	11.6

Table 3. Sutter County Air Quality Emissions—2008

		Annual e	missions (ton	s per day)			
Source type	Subcategory	ROG	CO	NO _X	SO_X	PM10	PM2.5
Stationary sources							
Fuel combustion							
Stationary	Electric utilities	0.04	0.07	0.6	0.01	0.1	0.1
Stationary	Cogeneration	0	0	0	0	0	0
Stationary	Oil and gas production (combustion)	0.25	0.43	1.76	0	0	0.05
Stationary	Manufacturing and industrial	0.01	0.06	0.33	0	0.02	0.02
Stationary	Food and agricultural processing	0.07	0.31	0.73	0	0.04	0.03
Stationary	Service and commercial	0.01	0.46	0.19	0	0.05	0.05
Stationary	Other (fuel combustion)	0	0.05	0.07	0	0	0.01
Total fuel combustion	0.38	1.38	3.68	0.01	0.21	0.26	
Cleaning and surface co	atings						
Stationary	Laundering	0	0	0	0	0	0
Stationary	Degreasing	0.14	0	0	0	0	0
Stationary	Coatings and related process solvents	0.13	0	0	0	0	0
Stationary	Printing	0.01	0	0	0	0	0
Stationary	Adhesives and sealants	0.02	0	0	0	0	0
Stationary	Other (cleaning and surface coatings)	0.01	0	0	0	0	0
Total cleaning and surfa	ce coatings	0.31	0	0	0	0	0
Petroleum production a	and marketing						
Stationary	Oil and gas production	2.54	0	0	0	0	0
Stationary	Petroleum refining	0.01	0	0	0	0	0
Stationary	Petroleum marketing	0.17	0	0	0	0	0
Stationary	Other (petroleum production and marketing)	0	0	0	0	0	0
Total petroleum produc	tion and marketing	2.72	0	0	0	0	0
Industrial processes							
Stationary	Food and agriculture	0.01	0	0	0	1.04	0.4
Stationary	Mineral processes	0	0	0	0	0.2	0.1

		Annual e	missions (tor	ıs per day)			
Source type	Subcategory	ROG	СО	NO _X	SO_X	PM10	PM2.5
Stationary	Wood and paper	0	0	0	0	0.13	0.07
Stationary	Other (industrial processes)	0	0	0	0	0.02	0.02
Total industrial processes		0.01	0	0	0	1.39	0.59
Total stationary sources	•	3.42	1.38	3.68	0.01	1.6	0.85
Area-wide sources							
Solvent evaporation							
Area-wide	Consumer products	0.59	0	0	0	0	0
Area-wide	Architectural coatings and related process solvents	0.27	0	0	0	0	0
Area-wide	Pesticides/fertilizers	0.85	0	0	0	0	0
Area-wide	Asphalt paving/roofing	0.13	0	0	0	0	0
Total solvent evaporation		1.84	0	0	0	0	0
Miscellaneous processes				III.			
Area-wide	Residential fuel combustion	0.3	4.63	0.22	0.01	0.67	0.64
Area-wide	Farming operations	0.19	0	0	0	5.16	0.77
Area-wide	Construction and demolition	0	0	0	0	0.63	0.06
Area-wide	Paved road dust	0	0	0	0	1.66	0.25
Area-wide	Unpaved road dust	0	0	0	0	2.27	0.23
Area-wide	Fugitive windblown dust	0	0	0	0	1.06	0.18
Area-wide	Fires	0	0.02	0	0	0	0
Area-wide	Managed burning and disposal	0.51	5.83	0.44	0.08	0.68	0.64
Area-wide	Cooking	0.01	0	0	0	0.04	0.03
Total miscellaneous proce	sses	1.01	10.48	0.66	0.09	12.17	2.8
Total area-wide sources		2.85	10.48	0.66	0.09	12.17	2.8
Mobile sources							
On road mobile sources							
Mobile	Light duty passenger (LDA)	0.69	6.2	0.54	0	0.03	0.02
Mobile	Light duty trucks - 1 (LDT1)	0.46	4.34	0.43	0	0.02	0.01
Mobile	Light duty trucks - 2 (LDT2)	0.37	3.66	0.47	0	0.02	0.02

		Annual e	nissions (ton	s per day)			
Source type	Subcategory	ROG	CO	NO _X	SO_X	PM10	PM2.5
Mobile	Medium duty trucks (MDV)	0.16	1.86	0.25	0	0.01	0.01
Mobile	Light heavy duty gas trucks - 1 (LHDV1)	0.08	0.58	0.1	0	0	0
Mobile	Light heavy duty gas trucks - 2 (LHDV2)	0.03	0.21	0.03	0	0	0
Mobile	Medium heavy duty gas trucks (MHDV)	0.12	0.93	0.07	0	0	0
Mobile	Heavy heavy duty gas trucks (HHDV)	0.03	0.51	0.05	0	0	0
Mobile	Light heavy duty diesel trucks - 1 (LHDV1)	0.01	0.04	0.17	0	0	0
Mobile	Light heavy duty diesel trucks - 2 (LHDV2)	0	0.02	0.09	0	0	0
Mobile	Medium heavy duty diesel trucks (MHDV)	0.01	0.13	0.62	0	0.02	0.02
Mobile	Heavy heavy duty diesel trucks (HHDV)	0.42	1.72	6.29	0.01	0.25	0.22
Mobile	Motorcycles (MCY)	0.12	1	0.03	0	0	0
Mobile	Heavy duty diesel urban buses (UB)	0	0	0	0	0	0
Mobile	Heavy duty gas urban buses (UB)	0	0	0	0	0	0
Mobile	School buses (SB)	0	0.03	0.05	0	0	0
Mobile	Other buses (OB)	0.01	0.05	0.01	0	0	0
Mobile	Motor homes (MH)	0.01	0.2	0.03	0	0	0
Total on road mobile sou	rces	2.52	21.48	9.23	0.01	0.35	0.3
Other mobile sources							
Mobile	Aircraft	0.51	4.78	0.26	0.05	0.02	0.02
Mobile	Trains	0.16	0.5	2.32	0.02	0.07	0.06
Mobile	Recreational boats	1.49	5.28	0.26	0	0.1	0.08
Mobile	Off-road recreational vehicles	0.33	1.06	0.01	0	0	0
Mobile	Off-road equipment	1.22	9.04	2.7	0	0.18	0.16
Mobile	Farm equipment	0.52	2.78	2.56	0	0.15	0.14
Mobile	Fuel storage and handling	0.14	0	0	0	0	0
Total off road mobile sou	rces	1.29	7.81	4.63	0	0.26	0.24
Total mobile sources		3.81	29.29	13.86	0.01	0.61	0.54
Sutter County total		10.08	41.15	18.2	0.11	14.38	4.19

A.4.4 Federal Nonattainment Status and Conformity Applicably

Local monitoring data (Table 1) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS. Table 4 summarizes the attainment status of the project area within Butte and Sutter Counties with regard to the NAAQS.

Table 4. Federal Attainment Status of the Project Area within Butte and Sutter Counties

	Project Area in Butte County	Project Area in Sutter County
Pollutant	NAAQS	NAAQS
1-hour O ₃	-	-
8-hour O ₃	Marginal Nonattainment ^a	Severe Nonattainment ^b /Attainment Unclassified ^c
CO	Moderate Maintenance ^a	Attainment
PM2.5	Nonattainment ^a	Nonattainment ^d
PM10	Attainment	Attainment

Sources: U.S. Environmental Protection Agency 2012.

- = No applicable standard.

CO = carbon monoxide.

NAAQS = national ambient air quality standards.

 O_3 = ozone.

PM2.5 = particulate matter less than 2.5 microns in diameter.

PM10 = particulate matter less than 10 microns in diameter.

- ^a Designation applies to activities occurring under Contract D in the Chico urbanized area.
- ^b Designation applies to activities occurring between Reaches 1 and 2 under Contract A.
- ^c Designation applies to activities occurring between Reaches 3 through 25 under Contracts A, B, and C.
- d Designation applies to activities occurring under Contracts A, B, and C.

The general conformity evaluation is made by comparing all emission sources (e.g., haul trucks, off-road equipment) to the applicable general conformity *de minimis* thresholds based on the regional nonattainment status. Table 5 summarizes the *de minimis* thresholds applicable to project activities.

Table 5. Federal General Conformity de minimis Thresholds

Threshold		Contract D		Contr	act A	Contracts A-D
Till Colloid	ROG	NOx	CO	ROG	NOx	PM2.5
Attainment Status	Marginal	Marginal	Moderate	Severe	Severe	Nonattainment
Attainment Status	Nonattainment	Nonattainment	Maintenance	Nonattainment	Nonattainment	Nonattamment
Applicable Threshold	100	100	100	25	25	100

The analysis of construction-related emissions associated with Alternative 2 indicates that NO_X emissions generated by Contract A would exceed the general conformity de minimis threshold under all years of construction (2014–2015). There would be no violations of any other de minimis thresholds. As the SFNA is classified as a nonattainment area with regards to the Federal 8-hour O_3 standard, the FRWLP requires a general conformity determination to demonstrate how

construction-related NO_X emissions associated with Contract A under Alternative 2 will conform to the SFNA SIP.

A.5 Relationship to Other Environmental Analyses

A Draft EIS/EIR will be published for public review and comment in December 2012 providing an analysis of the preferred alternative (Alternative 3), with publication of the Final EIS/EIR anticipated in summer 2013. The USACE is the lead Federal agency for the NEPA analysis documented in the EIS/EIR. The EIS/EIR was prepared to also be sufficient for purposes of CEQA.

NEPA requires an evaluation of air quality impacts associated with construction and operation of the proposed project. The analysis of impacts under CEQA were evaluated using the local thresholds of significance established by the FRAQMD and BCAQMD, while impacts under NEPA were made by evaluating whether the project would exceed general conformity *de minimis* thresholds. The Draft EIS/EIR presents the general conformity determination process and general findings in the general conformity determination for public and agency review, while the final general conformity determination will be published concurrent with the Record of Decision (ROD) for the Federal action.

A.6 Onsite Emission Reduction Measures

Mitigation measures to reduce onsite construction emissions were identified in Section 3.5.4, *Effects and Mitigation Measures* of the Draft EIS/EIR. These mitigation measures are consistent with NEPA and CEQA mitigation and minimization measures and will be required elements of the project, as they will be included in the project's Mitigation Monitoring and Reporting Program, as required under CEQA. The mitigation measures required in the EIS/EIR to reduce project-related emissions are described below.

Mitigation Measure AQ-MM-1: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

SBFCA will provide advance written notification of the proposed construction activities to all residences and other air quality–sensitive uses within 500 feet of the construction site. Notification will include a brief overview of the proposed project and its purpose, as well as the proposed construction activities and schedule. It also will include the name and contact information of SBFCA's project manager or a representative for ensuring that reasonable measures are implemented to address a problem.

The construction contractor will post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person will respond and take corrective action within 48 hours. The phone number of the appropriate air quality agency (FRAQMD or BCAQMD) also will be visible to ensure compliance with the agencies' regulations.

Mitigation Measure AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 or PM2.5 Thresholds

The construction contractor will implement all applicable and feasible fugitive dust control measures required by FRAQMD and BCAQMD, including those listed below. This requirement will be incorporated into the construction contract.

- Prior to mobilizing to the job site the construction contractor will submit a dust control plan to FRAQMD and BCAQMD.
- Water active unpaved areas at all construction sites at least twice daily in dry conditions or more frequently as required, with the frequency of watering based on the type of operation, soil, and wind exposure.
- Prohibit all grading activities and water all areas of disturbed soil under windy conditions (more than 20 miles per hour).
- Limit onsite vehicles to a speed that prevents visible dust emissions to extend beyond unpaved roads.
- Cover all trucks hauling dirt, sand, or loose materials.
- Cover active and inactive storage piles where appropriate.
- Cover or hydroseed unpaved areas that will remain inactive for extended periods.
- Apply soil stabilizers to active and inactive areas where appropriate.
- Install wheel washers at the entrance to construction sites for all exiting trucks.
- Sweep streets if visible soil material is carried out from the construction site. Sweeping will be done at least once per day unless conditions warrant a more frequent application.
- Install wind fencing and phase grading operations where appropriate.

Fugitive dust emissions from the construction of the FRWLP would be reduced to a less-than-significant level with the implementation of the fugitive dust control measures listed above.

Mitigation Measure AQ-MM-3: General Measures to Reduce Emissions

The SBFCA will implement the following mitigation measures.

- No open burning of removed vegetation. Vegetative material will be chipped or delivered to waste or energy facilities.
- Develop a traffic plan to minimize traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with a shuttle service. Schedule operations affecting traffic for off-peak hours. Minimize obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites.
- Reduce use, trips, and unnecessary idling of heavy equipment. Shut down idling equipment that is not used for more than 5 consecutive minutes as required by California law.
- Construction equipment exhaust emissions will not exceed 40% opacity or Ringelmann 2.0. Operators of vehicles and equipment found to exceed opacity limits will take action to repair the equipment within 72 hours or remove the equipment from service.

- Maintain all construction equipment in proper tune according to manufacturer's specifications.
- Locate stationary diesel-powered equipment and haul truck staging areas as far as practical from sensitive receptors.
- Use existing power sources (e.g., power lines) or clean fuel generators rather than conventional diesel generators, when feasible.
- Substitute gasoline-powered for diesel-powered equipment when feasible.
- Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require ARB Portable Equipment Registration with the state or a local district permit. The owner/operator will be responsible for arranging appropriate consultations with ARB or the air districts to determine registration and permitting requirements prior to equipment operation at the site.

Mitigation Measure AQ-MM-4: Fleet-Wide Emission Reductions for Large Off-Road Equipment

Prior to mobilizing to the job site, the construction contractor will assemble a comprehensive inventory list (make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used an aggregate of 40 or more hours for the construction project. The construction contractor then will apply the following mitigation measure to those pieces of equipment.

The construction contractor will provide a plan, for approval by FRAQMD and BCAQMD, demonstrating that the heavy-duty off-road equipment to be used at the project sites, including owned, leased, and subcontractor equipment, will achieve a project-wide fleet-average reduction of 20% for NO_X and 45% for DPM, compared to the most recent ARB fleet average at time of construction. SBFCA will use the construction mitigation calculator downloaded from the Sacramento Metropolitan Air Quality Management District web site (or similar tool approved by FRAQMD and BCAQMD) to perform the fleet average evaluation (Sacramento Metropolitan Air Quality Management District 2009). Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), or installation of after-treatment emission control devices. FRAQMD and BCAQMD will be contacted to review and approve the alternative measures.

Mitigation Measure AQ-MM-5: Pay Required Fees to FRAQMD and BCAQMD to Offset NO_X Emissions to Net Zero (0) for Emissions in Excess of General Conformity de minimis thresholds or to Quantities below Applicable FRAQMD and BCAQMD CEQA thresholds (where applicable)

After implementing the general tailpipe emission control measures listed in AQ-MM-4 to reduce daily-average construction emissions, SBFCA will pay offsite mitigation fees to FRAQMD and BCAQMD to offset NO_X emissions. Emissions in excess of the federal de minimis thresholds shall be reduced to net zero (0). Emissions not in excess of the de minimis thresholds, but above applicable air district CEQA thresholds shall be reduced to quantities below the numeric thresholds.

Prior to issuance of grading permits for the project, SBFCA will consult with FRAQMD and BCAQMD to define the best construction information and the appropriate computational tools to be used for the calculations. SBFCA will submit calculations to FRAQMD and BCAQMD documenting the tons of NO_X to be offset over the duration of the construction phase of the project. SBFCA will consult with FRAQMD and BCAQMD to define the required fee payment based on the most recent Carl Moyer program cost value. Prior to the approval of project plans or the issuance of grading permits, the SBFCA will submit proof that the offsite air quality mitigation fee has been paid to FRAQMD and BCAQMD, and that the construction air quality mitigation plan has been approved by FRAQMD, BCAQMD, and SBFCA.

A.7 Regulatory Procedures

The general conformity regulations establish certain procedural requirements that must be followed when preparing a general conformity evaluation. The major applicable procedural issues associated with the general conformity demonstration and a description of how these requirements are met are presented in this section. As previously indicated, the Draft EIS/EIR presents the general conformity determination for public and agency review. The final general conformity determination will be published concurrent with the ROD for the Federal action pursuant to 40 CFR §93.156.

A.7.1 Use of Latest Planning Assumptions

the general conformity regulations require that the analysis use the latest planning assumptions based on data (e.g., population, employment, travel, and congestion) made available by the area's MPOs (40 CFR §93.159[a]).

As the analysis of emissions resulting from construction-related activities would not require the use of population, employment, travel, and congestion data, this section is not applicable to the project.

A.7.2 Use of Latest Emissions Estimation Techniques

The general conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 CFR §93.159[b]).

Per guidance from the FRAQMD, construction emissions were estimated using the SMAQMD's Sacramento Roadway Construction Emission Model (SacRCEM) (version 7.1.2) (Sacramento Metropolitan Air Quality Management District 2012). SacRCEM uses the most recent version of the ARB's emission factor program, EMission FACtors 2011 (EMFAC2011) and OFFROAD2007/2011 model, which are the emission models used in the preparation of the SIP.

A.7.3 Major Construction Phase Activities

Project-specific data, including construction equipment lists and the construction schedule, were used to forecast construction emissions associated with the project using construction activity data provided by HDR, SBFCA's professional engineering team. Where project-specific data were not available, SacRCEM default settings were used. Calculations were performed for each year of construction (2013–2015).

A.7.4 Emissions Scenarios

The general conformity regulations require that the analysis reflect certain emission scenarios (40 CFR §93.159[d]). Specifically, these scenarios generally include the evaluation of the direct and indirect emissions from a proposed project for the following years.

- (1) The year mandated in the CAA for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan.
- (2) The year during which the total of direct and indirect emissions for the Federal action are projected to be the greatest on an annual basis.
- (3) Any year for which the applicable SIP specifies an emissions budget.

Question 1 is not applicable to the construction analysis, as construction years associated with Alternative 2(2013–2015) do not include the year in which attainment is designated for the region for the 8-hour O_3 standard. Question 2 is not applicable to the construction analysis, as there is currently no approved 8-hour O_3 SIP in which there is an approved emissions budget. The analysis of construction activities evaluates the construction period of 2013–2015, with maximum direct and indirect emissions expected in 2014 (see Table 8 below).

A.8 Applicability Analysis

The general conformity rule applies to all Federal actions located in nonattainment and maintenance areas that are not exempt from general conformity (are either covered by Transportation Conformity or listed in the rule), are not covered by a presumed-to-conform approved list², or do not have clearly *de minimis* emissions. The first step in a general conformity evaluation is to determine whether the project is located in a Federal nonattainment or a maintenance area.

A.8.1 Attainment Status of the Study Area

As previously indicated in Table 4, activities occurring under Contract D are located in an area currently designated moderate maintenance for the federal CO standard and marginal nonattainment for the federal 8-hour ozone standard. Activities occurring between Reaches 1 and 2 (Contract A) are located in an area designated severe nonattainment for the federal 8-hour ozone standard. The entire project area, including all activities under Contracts A through D, is designated a nonattainment area for the federal PM2.5 standard. Consequently, to fulfill general conformity requirements, an analysis must be undertaken to identify whether the proposed project's total emissions of O_3 , PM2.5, and CO are below the appropriate general conformity $de\ minimis$ levels indicated in Table 5.

A.8.2 Exemptions from General Conformity Requirements

As previously indicated, the general conformity rule applies to all Federal actions located in nonattainment and maintenance areas that are not exempt from general conformity (are either

² Category of activities designated by a Federal agency as having emissions below *de minimis* levels or otherwise do not interfere with the applicable SIP or the attainment and maintenance of the national ambient air quality standard.

covered by Transportation Conformity or listed in the rule), are not covered by a presumed-to-conform approved list, or do not have clearly *de minimis* emissions. In addition, the general conformity rule applies only to direct and indirect emissions associated with the portions of any Federal action that are subject to New Source Review (i.e., do not include stationary industrial sources requiring air quality permits from local air pollution control agencies) for which a Federal permitting agency has directly caused or initiated, has continued program responsibility for, or can practically control. None of these exemptions from general conformity apply to the proposed project.

A.8.3 Applicability for Federal Action

If it is determined a project is not exempt from general conformity, the applicability of the general conformity requirements to the Federal action is evaluated by comparing total direct and indirect emissions for each calendar year of to the appropriate general conformity *de minimis* thresholds indicated in Table 5.

In the event that total direct and indirect emissions attributable to the Federal action are below the *de minimis* thresholds for a pollutant, that pollutant is excluded from general conformity requirements and no further analysis is required, as it is assumed these pollutants would conform to the SIP. Those pollutants that could not be excluded from applicability must undergo a general conformity evaluation.

If the general conformity evaluation indicates that total direct and indirect emissions attributable to the Federal action are in excess of any of the general conformity *de minimis* thresholds, the applicant must perform a conformity determination. A conformity determination is made by satisfying any of the following requirements.

- Showing that the emission increases caused by the Federal action are included in the SIP.
- Demonstrating that the State agrees to include the emission increases in the SIP.
- Offsetting the action's emissions in the same or nearby area.
- Mitigating to reduce the emission increase.
- Utilizing a combination of the above strategies.

A.8.4 De minimis Emissions Rates

General conformity de minimis thresholds applicable to the project are summarized in Table 5.

A.9 Construction Activities Considered

The project would rehabilitate 44 miles of existing levee within Sutter and Butte Counties. Operation of the new facilities would require periodic maintenance, although activities are expected to be less extensive than existing conditions and would only take place over a few days per year. Accordingly, long-term operational emissions are part of the existing environmental baseline and thus would not create a substantial source of new emissions. The general conformity determination therefore focuses exclusively on construction-related emissions because there would be no effect related to project operations.

The EIS/EIR estimates construction-related emissions for each of the three alternatives currently being considered for the FRWLP. However, this conformity determination only includes an analysis of Alternative 2. A conformity determination is not required for the APA (Alternative 3) as air quality modeling indicates that criteria pollutants generated by the APA would not exceed applicable *de minimis* thresholds. For additional information on Alternatives 1 and 3, please refer to Chapter 3.5, *Air Quality*.

Construction of Alternative 2 would generate criteria pollutant emissions that would result in short-term impacts on ambient air quality in the study. Emissions would originate from mobile and stationary construction equipment exhaust, employee vehicle exhaust, haul truck exhaust, and dust from earthmoving and clearing the land. Construction-related emissions vary substantially depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

Emissions rates for major construction activities were calculated based on information provided by HDR (2012).

- Levee construction would occur in the years 2013 through 2015. The maximum daily and annual activity would take place in 2014, when portions of every project segment would undergo extensive construction.
- The type of each construction equipment, number of pieces of each type, and the duration of each type of construction activity. This information was provided by HDR (2012). The forecast equipment usage is listed in the technical modeling portion of this appendix. The appendix lists the pieces of equipment for Construction Contracts A, B, and C within FRAQMD jurisdiction and for Construction Contract D within BCAQMD jurisdiction.
- Duration of each type of construction activity in each project segment. This information was provided by the HDR (2012:1-40).
- Quantities of borrow material, spoil material, and supplies to be delivered to the project, for each project segment. This information was provided by HDR (2012).
- Number of employees for each project segment, each of whom was assumed to commute to the site in his or her own vehicle. This information was provided by HDR (2012).
- Default operating parameters for each type of construction equipment (horsepower, load factor and hours per day of usage).
- Default emission factors for non-road construction equipment, on-road delivery trucks, and on-road commute vehicles.

The following sections discuss the approach and methodology used to assess construction emissions associated with Alternative 2. A full description of construction analysis methodology can be found in the technical modeling portion of this appendix.

A.9.1 Construction Schedule

Construction of Alternative 2 is expected to occur between May 2013 and October 2015. Four construction contracts are anticipated (A through D). Each contract will be 2 years in duration and require ten separate phases. Table 6 outlines the expected construction schedule and phases associated with each construction contract.

Table 6. Construction Schedule and Phasing (Alternative 2)

	Contract A		Contract B ^a		Contract C		Contract D	
Phase	Start	Days	Start	Days	Start	Days	Start	Days
Contract Year 1								
1. Clearing and Grubbing/ Stripping	5/15/2014	20	5/15/2014	20	5/15/2013	10	5/15/2014	20
2. Borrow Site Preparation	5/15/2014	22	5/15/2014	20	5/15/2013	30	5/15/2014	20
3. Levee Degrading/ Work Surface Construction	6/12/2014	10	6/12/2014	12	5/21/2013	10	-	-
4. Cutoff Wall Construction	6/26/2014	10	6/30/2014	30	5/30/2013	15	-	-
5. Levee Reconstruction/ Seepage Berm Construction	6/12/2014	90	6/12/2014	85	5/23/2013	110	6/12/2014	93
6. Borrow Site Excavation	6/16/2014	90	6/12/2014	92	5/23/2013	110	6/12/2014	93
7. Utility Reconstruction	7/14/2014	65	7/14/2014	65	6/24/2013	65	7/12/2014	65
8. Levee Resurfacing	-	-	-	-	10/3/2013	12		
9. Hydroseeding	10/20/2014	10	10/20/2014	8	10/3/2013	12	10/21/2014	12
10. Demobilization/ Cleanup	10/16/2014	12	10/9/2014	10	10/21/2013	10	10/21/2014	10
Contract Year 2								
1. Clearing and Grubbing/ Stripping	5/15/2015	20	5/15/2015	20	5/15/2014	20	4/29/2015	20
2. Borrow Site Preparation	5/15/2015	30	5/15/2015	30	5/15/2014	30	4/29/2015	30
3. Levee Degrading/ Work Surface Construction			6/12/2015	10	6/12/2014	10	-	-
4. Cutoff Wall Construction	-		6/26/2015	20	6/26/2014	10	-	-
5. Levee Reconstruction/	6/12/2015	90	6/12/2015	55	6/12/2014	70	5/27/2015	92

	Contract A	Contract A		Contract B ^a		Contract C		
Phase	Start	Days	Start	Days	Start	Days	Start	Days
Seepage Berm Construction								
6. Borrow Site Excavation	6/26/2015	80	6/26/2015	55	6/26/2014	70	6/10/2015	92
7. Utility Reconstruction	7/14/2015	60	7/14/2015	55	7/14/2014	65	6/26/2015	65
8. Levee Resurfacing	-	-	-		10/2/2014	12	-	-
9. Hydroseeding	10/16/2015	10	9/11/2015	10	10/2/2014	12	10/16/2015	12
10. Demobilization/ Cleanup	10/16/2015	10	8/28/2015	10	10/20/2014	10	10/2/2015	10

⁻ Phase does not exist under the particular contract.

^a Contract B also includes a 40-day roadway construction phase, which is split between September 2014 and September 2015.



A.9.2 Offroad Equipment

SacRCEM (version 7.1.2) was used to calculate exhaust emissions from heavy-duty construction equipment. HDR (2012) provided information on equipment types, number, and duration for each phase and contract. Equipment horsepower and load factor were based on SacRCEM default values. A conservative operating assumption of eight hours per day was assumed for all equipment. Additional information on offroad equipment included in the emissions modeling can be found in Appendix D.

A.9.3 Employee Vehicle Exhaust

Emissions from employee vehicle trips were estimated using the SacRCEM. Based on information provided by HDR (2012), the following crew sizes were assumed for Construction Contracts A thorough D. Workers were assumed to be present throughout all phases associated with each contract (i.e., there would be 132 individuals onsite during phases 1 through 10 for contract A).

• Contract A: 132.

• Contract B: 129.

Contract C: 135.

• Contract D: 102.

All employees were assumed to make two trips to the project site per day. A conservative trip length of 30 miles was used in the emissions modeling.

A.9.4 Haul Truck Vehicle Exhaust

Heavy-duty haul trucks would be required for material hauling and soil movement. The majority of materials would be delivered during phases 4, 5, 8, and 10. Soil off-hauling would occur primarily during phases 1, 3, and 6. Table 7 summarizes the number of annual truck trips for each contract and phase. Criteria pollutant emissions associated with haul trucks were quantified using the information summarized in Table 7 and the SacRCEM. All trip lengths were assumed to be 7 miles, based on guidance provided by HDR (Kors pers. comm.).

Table 7. Annual Truck Trips by Contract and Phase (Alternative 2)

Material Type	Phase	Contract A	Contract B	Contract C	Contract D
Unsuitable Soil Disposal	1, 3	3	917	13,454	1,208
Bentonite	4	0	16	14	0
Aggregate Surfacing	8	0	113 a	600	0
Pipe Material	5	4	9	16	22
Demolition Debris	10	30	18	80	138
CLSM Backfill	5	13	18	52	38
Borrow Fill	6	67,833	97,271	111,717	25,063

^a Assumed to occur during the "roadway construction" phase.

A.9.5 Fugitive Dust from Land Clearing

Fugitive dust emissions from land disturbance were quantified using SacRCEM. Based on information provided by HDR (2012), the following disturbed areas were assumed for Construction Contracts A thorough D. Note that the estimates include all staging and easement areas. Approximately 85% of the total disturbed area would occur during phase 1 (Clearing and Grubbing/Stripping), whereas the remaining 15% would occur during phase 6 (Borrow Site Excavation) (Kors pers. comm.).

- Contract A: 92 acres per year (183 total contract).
- Contract B: 136 acres per year (272 total contract).
- Contract C: 172 acres per year (345 total contract).
- Contract D: 121 acres per year (241 total contract).

A.10 Estimated Emissions Rates and Comparison to *De minimis* Thresholds

As previously noted, this conformity determination only includes values associated with Alternative 2. An air quality determination is not required for Alternative 1 or the APA (Alternative 3) as air quality modeling indicates neither alternative would generate criteria pollutant emissions in excess of applicable *de minimis* thresholds.

Annual criteria pollutant emissions resulting from construction of Alternative 2 are presented in Table 8. Emissions estimates include implementation of onsite mitigation identified in the EIS/EIR (AQ-MM-1 through AQ-MM-4). Violations of the Federal *de minimis* thresholds are shown in underlined text.

Table 8. Annual Construction Emissions for Alternative 2 (2013, 2014, and 2015)

Analysis	Contract D			Contract A		Contracts A-D
	ROG	NOx	CO	ROG	NOx	PM2.5
Annual Mitigated Emis	ssions after Onsite	Mitigation (AQ-M	M-1 through AQ)-MM-4) a		
2013	0	0	0	0	0	1
2014	1	17	6	3	<u>37</u>	3
2015	1	16	6	3	<u>35</u>	2
Attainment Status	Marginal	Marginal	Moderate	Severe	Severe	Nonattainment
Attainment Status	Nonattainment	Nonattainment	Maintenance	Nonattainment	Nonattainment	Nonattamment
Applicable Threshold	100	100	100	25	<i>25</i>	100
Exceed Threshold	No	No	No	No	No	No
(2013)?	NO	NO	NO	NO	NO	NO
Exceed Threshold	No	No	No	No	Yes	No
(2014)?	NO	NO	NO	NO	163	NO
Exceed Threshold	No	No	No	No	Yes	No
(2015)?	110	INU	INU	INU	168	110

NA = not applicable.

^a Assumes a 20% reduction in NOx, a 55% reduction in PM exhaust, and a 75% reduction in fugitive dust.

b Threshold based on the regional nonattainment status.

A.11 Regional Effects

As shown in Table 8, construction of Contract A would exceed the federal de minimis threshold for NO_X . There would be no violations of any other de minimis thresholds. NO_X is a precursor to O_3 , for which Sutter and Butte Counties are in nonattainment for the NAAQS. Since Contract A emissions exceed the Federal de minimis threshold for NO_X , a general conformity determination must be made to demonstrate that total direct and indirect emissions of NO_X would conform to the appropriate O_3 SIP for each year of construction (2014 –2015). No additional analyses are required for the other pollutants or contracts.

A.12 General Conformity Evaluation

As disused in Section A.1.2., *General Conformity Requirements*, a positive general conformity determination can be made through one of five criteria (project inclusion in the SIP, revision to the SIP, offsets, additional mitigation, and/or a combination of strategies). This section summarizes the findings that were used to make the determination for the FRWLP.

A.12.1 Conformity Requirements for the Alternative 2

As shown in Table 8, construction-related NO_X emissions generated by Contract A exceed the Federal *de minimis* threshold (25 tons per year) during both construction years. The highest annual emissions are 37 tons, which occur in 2014, while emissions in 2015 would amount to 35 tons. Because NO_X emissions exceed the Federal *de minimis* threshold, a conformity determination is required for construction-related NO_X emissions generated by Contract A for years 2014 and 2015.

A.12.2 Compliance with Conformity Requirements

USACE herein demonstrates that construction-related NO_X emissions generated by Contract A (Alternative 2) would not result in a net increase in regional NO_X emissions within the SFNA. This will be achieved by offsetting NO_X emissions generated during both years of construction (2014 and 2015) to net zero. Purchasing offsets is consistent with the general conformity rule, which states that a positive conformity determination may be reached if project-related emissions are offset to net zero for all years in which pollutants exceed applicable *de minimis* thresholds (refer to Section A.1.2).

In the event that Alternative 2 is selected as the APA, the project proponents (SBFCA) will enter into a development mitigation contract with FRAQMD and BCAQMD to reduce NO_X emissions generated by the construction of Contract A to net zero through the procurement of offsite mitigation fees. The requirement for the mitigation contract would be imposed on the project through the following mitigation measure from the EIS/EIR.

Mitigation Measure AQ-MM-5: Pay Required Fees to FRAQMD and BCAQMD to Offset NO_X Emissions to Net Zero (0) for Emissions in Excess of General Conformity *de minimis* thresholds or to Quantities below Applicable FRAQMD and BCAQMD CEQA thresholds (where applicable)

After implementing the general tailpipe emission control measures listed in AQ-MM-4 to reduce daily-average construction emissions, SBFCA will pay offsite mitigation fees to FRAQMD and BCAQMD to offset NO_X emissions. Emissions in excess of the federal *de minimis* thresholds shall be reduced to net zero (0). Emissions not in excess of the *de minimis* thresholds, but above applicable air district CEQA thresholds shall be reduced to quantities below the numeric thresholds.

Prior to issuance of grading permits for the project, SBFCA will consult with FRAQMD and BCAQMD to define the best construction information and the appropriate computational tools to be used for the calculations. SBFCA will submit calculations to FRAQMD and BCAQMD documenting the tons of NO_X to be offset over the duration of the construction phase of the project. SBFCA will consult with FRAQMD and BCAQMD to define the required fee payment based on the most recent Carl Moyer program cost value. Prior to the approval of project plans or the issuance of grading permits, the SBFCA will submit proof that the offsite air quality mitigation fee has been paid to FRAQMD and BCAQMD, and that the construction air quality mitigation plan has been approved by FRAQMD, BCAQMD, and SBFCA.

The development mitigation contract outlined in AQ-MM-5 is a legally-binding agreement by which the project proponent (SBFCA) will provide applicable mitigation fees for NO_X emissions that exceed general conformity thresholds. Fees will contribute to the FRAQMD's Carl Moyer program. The Carl Moyer program is designed to reduce ROG, NO_X , and PM from on- and offroad sources. The payment fee for the Carl Moyer Program is currently \$17,080 per ton, in addition to a 5% administration fee. Fees collected by the FRAQMD are used to fund reduction projects within the SFNA.

The mitigation contract and the entirety of <u>all</u> applicable mitigation fees must be fully executed and binding on all parties 2 months prior to groundbreaking. In negotiating the terms of the mitigation contract, SBFCA, FRAQMD, and BCAQMD should seek clarification and agreement on air district responsibilities, including the following.

- Identification of appropriate offsite mitigation fees required for SBFCA.
- Processing of mitigation fees surrendered by SBFCA.
- Verification of emissions inventories submitted by SBFCA.
- Verification that offsite fees are applied to appropriate mitigation programs within the FRAQMD and BCAQMD.

The SBFCA will be required to quantify mitigation fees needed to satisfy the appropriate reduction amounts. Based on the emissions levels estimated for Contract A and the current payment fee of \$17,080 per ton of NO_X , total mitigation cost is expected to equal about \$1.2 million. An administrative fee of 5% would also need to be paid by the SBFCA to the FRAQMD to implement the program. Payment fees may vary by year and are sensitive to the number of projects requiring reductions within the same air basin. The types of projects funded through project contributions to the Carl Moyer program will be based on the need and demand at the time of project construction.

Prior projects funded through the Carl Moyer program include engine repowering, diesel catalyst retrofits, and engine electrification.

Daily and annual emissions monitoring will be required to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. Annual reports will include, at a minimum the following components.

- Calculated or measured emissions from construction activities over the reporting year.
- Projects selected for funding during the reporting year.
- Total funds distributed to selected projects during the reporting year.
- Cumulative funds distributed since program inception.
- Emissions reductions achieved during the reporting year.
- Cumulative reductions since program inception.
- Total emissions reductions remaining to satisfy the requirements of AQ-MM-5.

Excess offsite funds can be carried from previous to subsequent years in the event that additional reductions are achieved by onsite mitigation. If applicable, any excess offsite funds paid to the FRAQMD remaining at the end of final project construction will be returned to SBFCA.

In the event that Alternative 2 is selected as the APA, SBFCA would negotiate the final terms of the mitigation contract with the FRAQMD and BCAQMD. Final approval and execution of the contract by SBFCA and the air districts would occur concurrent with final approval of this general conformity determination. FRAQMD and BCAQMD have verified that there are sufficient emissions reductions projects within the air basin to fully offset the Contract A's NO_x exceedances (71 tons) to net zero.

A.13 Reporting

USACE is issuing this general conformity determination for public and agency review for a 30-day period as required by 40 CFR §§93.155 and 93.156. Emissions from construction of the project have been assessed and quantified using standard and accepted tools, techniques, and emission factors. Additional technical details are provided in the EIS/EIR. The air quality analysis, including this draft conformity determination, is based on consultation with BCAQMD and FRAQMD.

A.13.1 General Conformity Determination

The general conformity determination will be available for a 45-day public review in conjunction with the circulation of the draft FRWLP EIS/EIR. USACE will provide copies of this general conformity determination to the appropriate regional offices of the EPA, ARB, FRAQMD, BCAQMD, and other coordinating agencies. The USACE will also announce the availability of the general conformity determination in the Chico Enterprise Record, Appeal-Democrat, and Gridley Herald. A copy of this conformity determination will be made available on USACE's and SBFCA's websites, as well as at local libraries.

A.13.2 Revaluation and Redetermination of General Conformity

General conformity determinations are valid for a period of 5 years after the date of public notification for the final documentation (40 CFR §93.157(a)). Ongoing Federal activities at a given site that show continuous progress after a 5-year period do not require a redetermination so long as the activities are within the scope of the final conformity determination. Because construction of Contract A is expected to require no more than 2 years, the final general conformity determination will remain valid through completion of the Federal action.

A.14 Findings and Conclusions

Pursuant to 40 CFR Part 93 Subpart B, USACE has conducted a general conformity evaluation as part of the environmental review of the FRWLP. The project is subject to the general conformity rule because it is located an area that is designed nonattainment for the 8-hour O₃ standard (severe and moderate), nonattainment for PM2.5, and a (partial) moderate maintenance area for CO. USACE conducted the general conformity evaluation in consultation with air districts in the study area (BCAQMD and FRAQMD). Moreover, the emissions analyses are based on accepted standards and are in compliance with all applicable regulatory criteria and procedures.

Based on project-specific construction analysis, NO_X emissions generated by construction of Contract A under Alternative 2 would exceed the Federal *de minimis* threshold during all years of construction (2014 and 2015). USACE concluded that Contract A emissions would not result in a net increase in regional NO_X emissions, as construction-related NO_X emissions would be fully offset to zero through implementation of AQ-MM-5, which requires the payment of offsite mitigation fees. Accordingly, USACE has determined that Alternative 2, as designed, will conform to the approved SIP, based on the findings below.

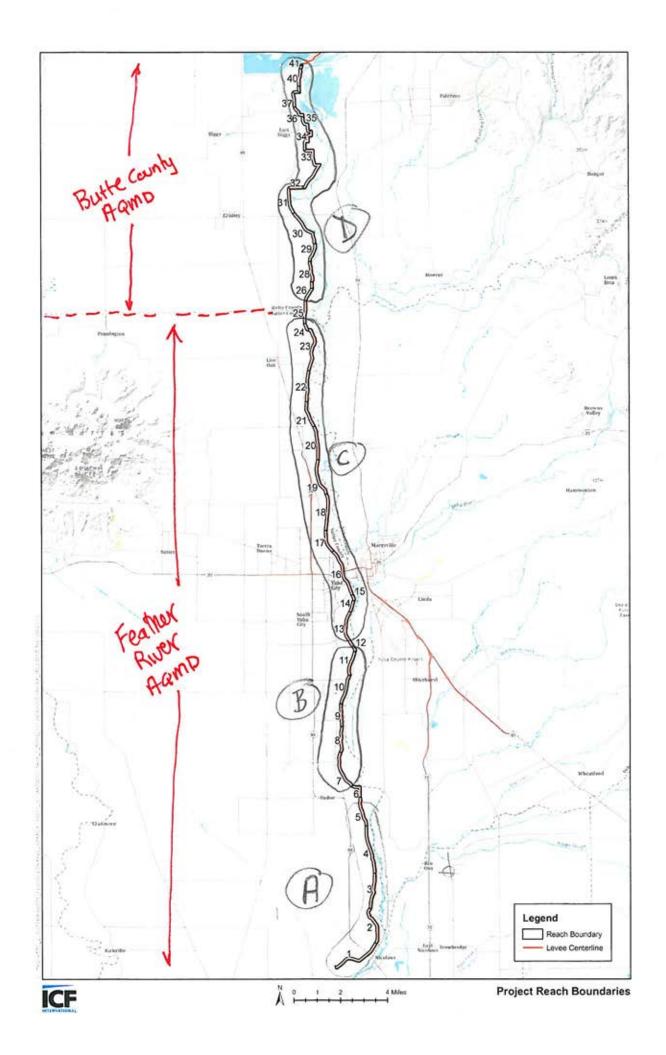
- A commitment from the SBFCA that Contract A NO_x emissions will be offset consistent with the
 applicable Federal regulations through a development mitigation contract with the FRAQMD
 and BCAQMD. In the event that Alternative 2 is selected as the APA, the following actions will be
 taken to execute the conformity determination contained herein.
 - \circ SBFCA, FRAQMD and BCAQMD will enter into a contractual agreement to mitigate the Contract A's NO_x emissions to net zero.
 - SBFCA will surrender moneys to FRAQMD's Carl Moyer Project to fund grants for projects that achieve the necessary emission reductions.
 - FRAQMD will seek and implement the necessary emission reduction measures, using SBFCA funds.
 - FRAQMD will serve in the role of administrator of the emissions reduction projects and verifier of the successful mitigation effort.

Therefore, USACE herewith concludes that the Alternative 2, as designed, conforms to the purpose of the approved SIP and is consistent with all applicable requirements.

A.15 References

- California Air Resources Board. 2011. iADAM Air Quality Data Statistics. http://www.arb.ca.gov/adam/index.html. Accessed: June 17, 2011.
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- Sacramento Metropolitan Air Quality Management District. 2009. Guide to Air Quality Assessment in Sacramento County. Sacramento, CA. December.
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- Sacramento Valley Air Quality Engineering and Enforcement Professionals. 2010. Northern Sacramento Valley Planning Area 2009 Triennial Air Quality Attainment Plan. Final. Sacramento, CA.
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- U.S. Environmental Protection Agency. 2009. Air Data. Last revised: January 10, 2009. http://www.epa.gov/air/data/reports.html. Accessed: June 17, 2011.
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AIR QUALITY APPENDIX CALCULATION SPREADSHEETS AND SUPPORTING INFORMATION



MEMORANDUM

TO: Mr. Mike Inamine, Sutter Butte Flood Control Agency

FROM: HDR/Wood Rodgers Design Team

DATE: January 17, 2012

SUBJECT: SBFCA, Feather River West Levee Project, Project Description for CEQA/NEPA

Analysis, Version 2.0

INTRODUCTION

In 2010, the Sutter Butte Flood Control Agency (SBFCA) embarked on the Feather River West Levee (FRWL) Project. The project seeks to rehabilitate 44 miles of existing levee along the west bank of the Feather River through Sutter and Butte Counties. A geotechnical assessment of the levees has been completed and the potential mitigation measures to address the deficiencies in each reach has been analyzed by the design team. These alternatives are outlined in detail in the Project Pre-design Formulation Report (Reference 1). The design of the project is currently approaching the 60-percent level.

The purpose of this Memorandum is to provide the information requested by ICF International (Reference 3), for the purpose of preparing project CEQA/NEPA Analyses. Estimates of the quantity and duration of equipment usage, labor workforce, and materials necessary to construct each of the three project alternatives are provided within this Memorandum. Other information, including power consumption, estimate of the disturbed area, and other information requested in Reference No. 3 is also included. Version 2.0 of this project description addresses additional information requested by ICF/Jones and Stokes as discussed on Monday, January 9, 2012.

REFERENCES

- 1. HDR, Wood Rodgers, URS, and MHM, "Pre-design Formulation Report, Feather River West Levee Segments 1 through 7, Sutter Butte Levee Rehabilitation Program, Sutter and Butte Counties, California," February 2011.
- 2. PBI, "Technical Memorandum, SBFCA Feather River West Levee Project, Preliminary Construction Project Prioritization Analysis," July 11, 2011.
- 3. ICF International, "Revised Data Requests for the Feather River West Levee Project EIS/EIR," September 30, 2011.
- 4. Wood Rodgers, Inc., SBFCA, "Feather River West Levee Project, Preliminary Assessment of Borrow Requirements and Potential Borrow Sites," August 12, 2011.

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CONSTRUCTION PHASING

Outlined in Reference 2 are four projects corresponding to the likely construction contracts for construction of the overall project. The four projects, or Construction Contracts as referenced herein, and their respective areas for construction of the FRWL project, are identified in Table 1 below.

Table 1 – Construction Contracts and FRWL Reaches

Construction Contract	FRWL Reaches
A	2 Through 5
В	7 Through 11
С	13 Through 24
D	26 Through 41

It is noted that Reaches 6, 12, and 25 are no work reaches on the project. At the south end of the project, the work begins at Station 202+50, within Reach 2. Reach 1 is not currently a part of the Phase 1 Project.

ALTERNATIVES DESCRIPTION

For each of the Construction Contracts identified, there are three alternatives under consideration. The first alternative (Alternative 1) rehabilitates the levee primarily using cutoff walls such that the overall footprint of the levee is not expanded. This alternative is referred to within this memorandum as the "Minimized Footprint" alternative. The second alternative (Alternative 2) rehabilitates the levee using primarily seepage and stability berms, expanding the overall footprint of the existing levee. This alternative is referred to as the "Expanded Footprint" alternative. The third alternative (Alternative 3), rehabilitates the levee by selecting the lowest cost rehabilitation measure (whether a cutoff wall or a seepage berm) such that the overall cost of the project is minimized. This alternative is referred to in this memorandum as the "Optimized Footprint" alternative.

CONSTRUCTION SCHEDULE

Construction of the Project is anticipated to occur beginning in 2013 and continue through 2015. A total of four construction contracts are anticipated, issued in a sequence to match the priority ranking identified in Reference 2. Each of the contracts will be two years in duration. Table 2 below outlines the construction priority and years identified for construction.

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Table 2 – Construction Priority and Years of Construction

Construction Contract	Years for Construction	
С	2013 through 2014	
D	2013 through 2014	
В	2014 through 2015	
A	2014 through 2015	

For each construction season, the maximum window of work is anticipated to be May 1st through November 1st. This start date of construction corresponds to the end of the Giant Garter Snake (GGS) activity period, while November 1st marks the beginning of the flood season for the Sacramento River Flood Control Project. It may be the case that additional construction window restrictions on account of nesting raptors or early season (October) GGS activity may occur and are not accounted for in this analysis.

The construction of each contract is anticipated to occur in single 10 hour shifts, six days a week. An exception to this schedule is cutoff wall construction, which is anticipated to occur in two 10 hour shifts, (24-hour construction) six days a week. While production work will not occur between the two 10 hour shifts, equipment maintenance and preparations for the upcoming work shift will occur.

A construction schedule for each of the alternatives relating of each construction contract is included in Appendix A.

EQUIPMENT AND MANPOWER ESTIMATES

Within each project description outlined below, there are summary Tables for the equipment type, duration, and sequencing for each construction project alternative. The supporting calculations for these estimates are included as Appendix B of this memorandum.

POTENTIAL BORROW SITES

Up to eight potential borrow sites are identified within Reference 4 above for the Project. Location maps for the borrow areas within Yuba City and Live Oak are provided as Figures 1 and 2. It may be the case that additional borrow sites not currently identified are eventually identified and used as sources of borrow for this Project. For the purposes of this memorandum, it is assumed any additional sites are a similar distance to the work areas and require similar equipment and manpower to excavate, borrow, and haul material to the levee rehabilitation sites. The acreage of the primary borrow sites included in Reference 4, are as follows in Table 3 below:

Table 3 – Borrow Site Acreage

Borrow Site	Area, Acres
Yuba City North	28
Yuba City South	70
Live Oak North	34
Live Oak South	28
Live Oak East	13
Live Oak West	7
Caltrans Property	26

RIGHT-OF-WAY AND EASEMENTS

Throughout the project length, the State and/or local levee maintaining agencies hold various easements and fee rights to the land beneath and adjacent to the Feather River West Levee. Due to the age of the system, and the numerous projects to upgrade the levee system over the years, the land right vary significantly throughout the project. One objective of the project is to upgrade these rights so that the State and local maintaining agencies have appropriate and consistent land rights throughout the length to operate and maintain the levee system. To this end, SBFCA has coordinated with the Central Valley Flood Protection Board (CVFPB) and Department of Water Resources (DWR) to acquire the following rights-of-way for the project:

• Waterside: 15 feet

• Landside: 30 feet minimum, 40 feet where orchards or other continuous obstructions are not present.

Where the current rights beneath or adjacent to the levee are currently owned as an easement, the project will upgrade the rights to fee ownership.

For the waterside right-of-way, and the first 20 feet of the 30 feet to be obtained landward of the levee, existing trees and encroachments will be removed to the extent necessary to facilitate construction of the project and to support long term operation and maintenance of the project. It may be the case that some trees, structures, and other encroachments are not removed from the rights-of-way. These encroachments will be addressed on a case by case basis during final design of the project.

The outer ten feet of the landside easement will be granted in easement back to the existing landowner and will be allowed to be used for agricultural purposes following construction of the project.

Staging areas will only be provided within the right-of-way and easement limits described above. The contractor may reach agreements with landowners for additional staging locations outside of

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these limits. Staging areas may be used by the contractor for storage of equipment and materials, project offices, employee parking, and other uses needed for construction of the project.

Cutoff wall construction requires temporary establishment of an on-site slurry batch plant that would occupy about 1 to 2 acres. Batch plants will be located at approximately 1-mile intervals along the levee. The batch plant site would likely contain tanks for water storage, bulk bag supplies of bentonite, bentonite and cement storage silos, a cyclone mixer, pumps, and two generators that meet air quality requirements. The site would also accommodate slurry tanks to store the blended slurries temporarily until they are pumped to the work sites. Slurry ingredients would be mixed with water at the batch plant and the mixture would be pumped from the tanks through pipes to the cutoff wall construction work sites. The batch plant would produce two different slurry mixes, one for trench stabilization and one for the soil backfill mix. Therefore, two slurry pipes or hoses, typically 4- or 6-inch high-density polyethelene pipes, would be laid on the ground and would extend to all work sites. An additional pipe may be used to supply water to the work sites.

MATERIALS DELIVERY AND OFF HAULING

Typical deliveries and off hauling for each project includes bentonite powder, used for making cutoff wall trench slurry and backfill, pipe delivery for irrigation pipe relocation and replacement, aggregate road surfacing, and demolition debris off hauling. For backfill of new pipelines crossing the levee, Controlled Low Strength Material (CLSM), otherwise referred to as light-weight concrete, is required to be placed to the pipeline's spring line. A table is included for each project alternative summarizing the total number of materials deliveries and off hauling associated with the project. The calculations for deliveries and debris hauling for encroachments is included as Appendix C.

PROJECT A, REACHES 1 THROUGH 5

Project A of the FRWL begins at Levee Station 202+50 near the intersection of the FRWL and Laurel Road, and continues north to the beginning of the improvements constructed, as part of the Star Bend Setback Levee project, Levee Station 478+68. The total length of the levee in this portion of the FRWL project is 27,618 linear feet.

Alternative 1 would construct a cutoff wall ranging between 30 feet and 127 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height with 2,900 feet of the levee being fully degraded. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep soil mixing (DSM) method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. In addition to the cutoff wall, Alternative 1 would construct a 200-foot wide seepage berm for 2,268 feet. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction and seepage berm

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construction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 1, including staging and construction easement areas, is 137.1 acres.

The crew size for Alternative 1 during the peak is estimated at 115-125 people working on two fronts, 10-hour shifts, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 4. The anticipated material quantities associated with this alternative is included in Table 5. The total number of anticipated trucks for materials delivery and off hauling is included in Table 6.

Table 4
Anticipated Equipment and Durations for Project A
Alternative 1 – Minimized Footprint Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(8) Elevating Scrapers	20 Days
Stripping	(2) Water Trucks	20 Days
	(4) Front-End Loaders	20 Days
	(2) Haul Trucks	20 Days
	(5) Pickup Trucks	20 Days
2. Borrow Site Preparation	(2) Tractors with Discing Equipment	20 Days
(Concurrent with 1.)	(2) Elevating Scrapers	20 Days
	(1) Water Truck	20 Days
3. Levee Degrading/	(3) Excavators	40 Days
Work Surface Construction	(15) Scrapers	40 Days
(Lags 1. by 15 days)	(5) Vibratory Rollers	40 Days
	(3) Water Trucks	40 Days
	(7) Haul Trucks	40 Days
4. Cutoff Wall Construction	(4) Hydraulic Excavators	60 Days
(Lags 3. by 22 days)	(2) Front-End Loaders	60 Days
	(1) DSM Auger	60 Days
	(1) Extended Boom Pallet Loader	60 Days
	(3) 300 kW Generators	60 Days
	(2) Slurry Pumps	60 Days
	(5) Pickup Trucks	60 Days
	(3) Haul Trucks	60 Days
	(2) Water Trucks	60 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
5. Levee Reconstruction/	(20) Scrapers	60 Days
Seepage Berm	(2) Motor Graders	60 Days
Construction	(5) Vibratory Rollers	60 Days
(Lags 4. by 25 days)	(3) Water Trucks	60 Days
6. Borrow Site Excavation	(2) Front-End Loaders	60 Days
(Concurrent with 5.)	(2) Excavators	60 Days
	(2) Water Trucks	60 Days
	(50) Haul Trucks	60 Days
7. Utility Reconstruction	(2) Backhoes	100 Days
	(2) Front End Loaders	100 Days
	(2) Rubber Tire Crane	100 Days
	(3) Pickup trucks	100 Days
	(2) Water Trucks	100 Days
8. Levee Resurfacing	(2) Motor Graders	22 Days
(Follows 5.)	(2) Vibratory Rollers	22 Days
	(2) Haul Trucks	22 Days
	(1) Water Truck	22 Days
	(2) Motor Graders	22 Days
9. Hydroseeding	(2) Hydroseeding Trucks	18 Days
(Concurrent with 8.)		
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	18 Days
(Lags 9. by 5 days)	(2) Haul Trucks	18 Days

Table 5
Anticipated Major Materials Quantities for Project A
Alternative 1 – Minimized Footprint Alternative

Description	Quantity		
Clearing and Grubbing	83.5 Acres		
Levee Embankment Degrade	602,400 Cubic Yards		
SB Cutoff Wall	1,457,000 Square Feet		
Levee Embankment Fill	782,000 Cubic Yards		
Borrow Site Excavation	244,000 Cubic Yards		
Unsuitable Material Export	31,500 Cubic Yards		
Class 2 Aggregate Surfacing	13,100 Tons		

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Table 6
Number of Trucks for Materials Delivery and Off Hauling – Project A, Alternative 1

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
89	425	8	60	26

Alternative 2 would construct an undrained seepage berm ranging between 100 feet and 300 feet in width along the landside toe of the levee. Additionally, an 8-foot high stability berm would be constructed along 20,817 feet of the project. Also, a shallow cutoff wall 20 feet in depth would be constructed along the levee centerline for 1,616 feet of the project. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by the conventional, long-reach excavator method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, seepage and stability berm construction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 2, including staging and construction easement areas, is 259.1 acres.

The crew size for Alternative 2 during the peak is estimated at 195-205 people working one 10-hour shift, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 7. For a listing of the anticipated material quantities associated with this alternative, see Table 8. The total number of anticipated trucks for materials delivery and off hauling is included in Table 9.

Table 7
Anticipated Equipment and Durations for Project A,
Alternative 2 – Expanded Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(8) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(4) Front-End Loaders	40 Days
		(2) Haul Trucks	40 Days
		(5) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(4) Tractors with Discing Equipment	22 Days
	(Concurrent with 1.)	(4) Elevating Scrapers	22 Days
		(2) Water Truck	22 Days

	Construction Phase	Number of Each Equipment Type	Duration of Use
3.	Levee Degrading/	(1) Excavators	10 Days
	Work Surface Construction	(2) Scrapers	10 Days
	(Follows 1.)	(2) Vibratory Rollers	10 Days
		(1) Water Trucks	10 Days
		(2) Haul Trucks	10 Days
4.	Cutoff Wall Construction	(2) Hydraulic Excavators	10 Days
	(Follows 3.)	(1) Front-End Loaders	10 Days
		(1) Extended Boom Pallet Loader	10 Days
		(2) 300 kW Generators	10 Days
		(1) Slurry Pumps	10 Days
		(3) Pickup Trucks	10 Days
		(2) Haul Trucks	10 Days
		(1) Water Trucks	10 Days
5.	Levee Reconstruction/	(25) Scrapers	180 Days
	Seepage and Stability	(5) Motor Graders	180 Days
	Berm Construction	(2) Hydraulic Excavators	180 Days
	(Lags 2. by 15 days)	(5) Vibratory Rollers	180 Days
		(4) Water Trucks	180 Days
6.	Borrow Site Excavation	(4) Front-End Loaders	170 Days
	(Concurrent with 5.)	(4) Excavators	170 Days
		(4) Water Trucks	170 Days
		(85) Haul Trucks	170 Days
7.	Utility Reconstruction	(2) Backhoes	115 Days
	•	(2) Rubber Tire Crane	115 Days
		(2) Front End Loaders	115 Days
		(3) Pickup trucks	115 Days
		(2) Water Trucks	115 Days
8.	Levee Resurfacing	(1) Motor Graders	5 Days
	(Follows 5.)	(1) Vibratory Rollers	5 Days
	,	(2) Haul Trucks	5 Days
		(1) Water Truck	5 Days
9.	Hydroseeding (Follows 5.)	(2) Hydroseeding Trucks	20 Days
10	. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	22 Days
	(Lags 9. by 5 days)	(2) Haul Trucks	22 Days

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Table 8
Anticipated Major Materials Quantities for Project A,
Alternative 2 – Expanded Footprint Alternative

Description	Quantity	
Clearing and Grubbing	183.1 Acres	
Levee Embankment Degrade	16,500 Cubic Yards	
SB Cutoff Wall	13,500 Square Feet	
Levee Embankment Fill	1,373,000 Cubic Yards	
Borrow Site Excavation	1,628,000 Cubic Yards	
Unsuitable Material Export	75 Cubic Yards	
Class 2 Aggregate Surfacing	1,425 Tons	

Table 9
Number of Trucks for Materials Delivery and Off Hauling – Project A, Alternative 2

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
1	50	8	60	26

Alternative 3 would construct a cutoff wall ranging between 20 feet and 127 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep soil mixing (DSM) method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. In addition to the cutoff wall, Alternative 3 would construct a 100-foot wide seepage berm for 1,616 feet and a 200-foot wide seepage berm for 2,268 feet. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction and seepage berm construction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 3, including staging and construction easement areas, is 142.4 acres.

The crew size for Alternative 3 during the peak is estimated at 115-125 people working on two fronts, 10-hour shifts, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 10. For a listing of the anticipated material quantities associated with this alternative, see Table 11. The total number of anticipated trucks for materials delivery and off hauling is included in Table 12.

Table 10
Anticipated Equipment and Duration for Project A,
Alternative 3 – Optimized Footprint Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(8) Elevating Scrapers	40 Days
Stripping	(2) Water Trucks	40 Days
	(4) Front-End Loaders	40 Days
	(5) Pickup Trucks	40 Days
2. Borrow Site Preparation	(2) Tractors with Discing Equipment	60 Days
(Concurrent with 1.)	(2) Elevating Scrapers	60 Days
	(1) Water Truck	60 Days
3. Levee Degrading/	(3) Excavators	100 Days
Work Surface Construction	(15) Scrapers	100 Days
(Lags 1. by 15 days)	(5) Vibratory Rollers	100 Days
	(3) Water Trucks	100 Days
	(7) Haul Trucks	100 Days
4. Cutoff Wall Construction	(5) Hydraulic Excavators	60 Days
(Lags 3. by 15 days)	(2) Front-End Loaders	60 Days
	(1) DSM Auger	30 Days
	(1) Extended Boom Pallet Loader	60 Days
	(4) 300 kW Generators	60 Days
	(2) Slurry Pumps	60 Days
	(5) Pickup Trucks	60 Days
	(3) Haul Trucks	60 Days
	(2) Water Trucks	60 Days
5. Levee Reconstruction/	(20) Scrapers	60 Days
Seepage and Stability	(2) Motor Graders	60 Days
Berm Construction	(5) Vibratory Rollers	60 Days
(Lags 4. by 25 days)	(3) Water Trucks	60 Days
6. Borrow Site Excavation	(2) Front-End Loaders	50 Days
(Concurrent with 5.)	(2) Hydraulic Excavators	50 Days
	(2) Water Trucks	50 Days
	(50) Haul Trucks	50 Days
7. Utility Reconstruction	(2) Backhoes	130 Days
	(2) Rubber Tire Crane	130 Days
	(2) Front End Loaders	130 Days
	(3) Pickup trucks	130 Days
	(2) Water Trucks	130 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
8. Levee Resurfacing	(2) Motor Graders	24 Days
(Follows 5.)	(2) Vibratory Rollers	24 Days
	(2) Haul Trucks	24 Days
	(1) Water Truck	24 Days
9. Hydroseeding (Concurrent with 8.)	(2) Hydroseeding Trucks	24 Days
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	24 Days
(Lags 9. by 5 days)	(2) Haul Trucks	24 Days

Table 11
Anticipated Major Materials Quantities for Project A,
Alternative 3 – Optimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	87.2 Acres
Levee Embankment Degrade	548,000 Cubic Yards
SB Cutoff Wall	1,272,000 Square Feet
Levee Embankment Fill	759,700 Cubic Yards
Borrow Site Excavation	276,250 Cubic Yards
Unsuitable Material Export	25,750 Cubic Yards
Class 2 Aggregate Surfacing	10,000 Tons

Table 12 Number of Trucks for Materials Delivery and Off Hauling – Project A, Alternative 3

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
78	350	8	60	26

PROJECT B, REACHES 7 THROUGH 11

Project B of the FRWL begins at Levee Station 510+37, the end of the improvements constructed as part of the Star Bend Setback Levee project, and continues north Levee Station 830+00. The total length of the levee in this portion of the FRWL project is 31,963 linear feet. Three alternatives have been reviewed as part of the Feather River West Levee Pre-Design Formulation Report. Alternative 1 would construct a cutoff wall along the centerline of the existing levee to a varying depth and a seepage berm along a portion of the landside levee toe. Alternative 2 would construct seepage and stability berms along the landside toe of the levee and a shallow cutoff wall along a portion of the centerline of the levee. Alternative 3 is an optimized alternative, combining mitigation measures from both Alternative 1 and Alternative 2 to produce the most economically feasible project. For Project B, the most economically feasible project is

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to construct a cutoff wall along the centerline of the existing levee. Therefore, Alternative 1 and Alternative 3 are the same for this project.

Alternative 1 would construct a cutoff wall ranging between 39 feet and 124 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height with 1,900 feet of the levee being fully degraded. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep soil mixing (DSM) method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up. SBFCA will acquire a temporary construction easement equal to 50 feet from the existing levee toe or toe of the proposed seepage berm for construction of the levee improvements. An additional 20-foot easement will be obtained where required for the relocation of existing utilities. The total disturbed area for Alternative 1, including staging and construction easement areas, is 155.1 acres.

The crew size for Alternative 1 during the peak is estimated at 110-120 people working on two fronts, 10-hour shifts, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 13. For a listing of the anticipated material quantities associated with this alternative, see Table 14. The total number of anticipated trucks for materials delivery and off hauling is included in Table 15.

Table 13
Anticipated Equipment and Duration for Project B,
Alternative 1 – Minimized Footprint Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(8) Elevating Scrapers	40 Days
Stripping	(2) Water Trucks	40 Days
	(4) Front-End Loaders	40 Days
	(5) Pickup Trucks	40 Days
2. Borrow Site Preparation	(2) Tractors with Discing Equipment	60 Days
(Concurrent with 1.)	(2) Elevating Scrapers	60 Days
	(1) Water Truck	60 Days
3. Levee Degrading/	(3) Excavators	80 Days
Work Surface Construction	(15) Scrapers	80 Days
(Lags 1. by 14 days)	(5) Vibratory Rollers	80 Days
	(3) Water Trucks	80 Days
	(7) Haul Trucks	80 Days

	Construction Phase	Number of Each Equipment Type	Duration of Use
4.	Cutoff Wall Construction	(4) Hydraulic Excavators	50 Days
	(Lags 3. by 14 days)	(2) Front-End Loaders	50 Days
		(2) DSM Auger	50 Days
		(1) Extended Boom Pallet Loader	50 Days
		(4) 300 kW Generators	50 Days
		(2) Slurry Pumps	50 Days
		(5) Pickup Trucks	50 Days
		(3) Haul Trucks	50 Days
		(2) Water Trucks	50 Days
5.	Levee Reconstruction	(20) Scrapers	80 Days
	(Follows 4.)	(2) Motor Graders	80 Days
		(5) Vibratory Rollers	80 Days
		(3) Water Trucks	80 Days
6.	Borrow Site Excavation	(2) Front-End Loaders	80 Days
	(Concurrent with 5.)	(2) Hydraulic Excavators	80 Days
		(2) Water Trucks	80 Days
		(50) Haul Trucks	80 Days
7.	Utility Reconstruction	(2) Backhoes	130 Days
		(2) Rubber Tire Crane	130 Days
		(2) Front End Loaders	130 Days
		(3) Pickup trucks	130 Days
		(2) Water Trucks	130 Days
8.	Levee Resurfacing	(2) Motor Graders	20 Days
	(Follows 5.)	(2) Vibratory Rollers	20 Days
		(2) Haul Trucks	20 Days
		(1) Water Truck	20 Days
9.	Hydroseeding (Concurrent with 8.)	(2) Hydroseeding Trucks	20 Days
10	. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	15 Days
	(Lags 9. by 10 days)	(2) Haul Trucks	15 Days

Table 14
Anticipated Major Materials Quantities for FRWL, Project B,
Alternative 1 – Minimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	94.1 Acres
Levee Embankment Degrade	931,900 Cubic Yards
SB Cutoff Wall	1,948,500 Square Feet
Levee Embankment Fill	1,086,500 Cubic Yards

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Description	Quantity
Borrow Site Excavation	796,750 Cubic Yards
Unsuitable Material Export	520,250 Cubic Yards
Class 2 Aggregate Surfacing	12,000 Tons

Table 15 Number of Trucks for Materials Delivery and Off Hauling – Project B, Alternative 1

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
119	400	17	36	36

Alternative 2 would construct an undrained seepage berm ranging between 110 feet and 300 feet in width along the landside toe of the levee. Additionally, a stability berm approximately 9.5 feet tall would be constructed along 14,163 feet of the project. Also, a shallow cutoff wall ranging between 23 feet and 35 feet in depth would be constructed along the levee centerline for 17,800 feet of the project. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by the conventional, long-reach excavator method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. A portion of the existing Garden Highway will need to be removed and reconstructed to allow construction of the seepage berm. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, seepage and stability berm construction, borrow site excavation, utility relocation and reconstruction, roadway reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 2, including staging and construction easement areas, is 331.8 acres.

The crew size for Alternative 2 during the peak is estimated at 190-200 people working one 10-hour shift, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 16. For a listing of the anticipated material quantities associated with this alternative, see Table 17. The total number of anticipated trucks for materials delivery and off hauling is included in Table 18.

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Table 16
Anticipated Equipment and Duration for Project B,
Alternative 2 – Expanded Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(8) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(4) Front-End Loaders	40 Days
		(5) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(4) Tractors with Discing Equipment	50 Days
	(Concurrent with 1.)	(4 Elevating Scrapers	50 Days
		(2) Water Truck	50 Days
3.	Levee Degrading/	(1) Excavators	22 Days
	Work Surface Construction	(2) Scrapers	22 Days
	(Follows 1.)	(2) Vibratory Rollers	22 Days
		(1) Water Trucks	22 Days
		(6) Haul Trucks	22 Days
4.	Cutoff Wall Construction	(4) Hydraulic Excavators	50 Days
	(Lags 3. by 15 days)	(1) Front-End Loaders	50 Days
		(1) Extended Boom Pallet Loader	50 Days
		(2) 300 kW Generators	50 Days
		(2) Slurry Pumps	50 Days
		(3) Pickup Trucks	50 Days
		(2) Haul Trucks	50 Days
		(1) Water Trucks	50 Days
5.	Levee Reconstruction/	(25) Scrapers	145 Days
	Seepage and Stability	(5) Motor Graders	145 Days
	Berm Construction	(5) Vibratory Rollers	145 Days
	(Lags 2. by 15 days)	(4) Water Trucks	145 Days
6.	Borrow Site Excavation	(4) Front-End Loaders	145 Days
	(Concurrent with 5.)	(2) Hydraulic Excavators	145 Days
		(4) Water Trucks	145 Days
		(85) Haul Trucks	145 Days
7.	Utility Reconstruction	(2) Backhoes	130 Days
		(2) Rubber Tire Crane	130 Days
		(2) Front End Loaders	130 Days
		(3) Pickup trucks	130 Days
		(2) Water Trucks	130 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
8. Roadway Reconstruction	(2) Motor Graders	40 Days
(Follows 5.)	(1) Paving Machine	40 Days
	(2) Vibratory Rollers	40 Days
	(4) Haul Trucks	40 Days
	(1) Water Truck	40 Days
9. Levee Resurfacing	(2) Motor Graders	20 Days
(Follows 5.)	(1) Vibratory Rollers	20 Days
	(1) Haul Trucks	20 Days
	(1) Water Truck	20 Days
10. Hydroseeding	(2) Hydroseeding Trucks	20 Days
(Concurrent with 8.)		
11. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	15 Days
(Lags 9. by 10 days)	(2) Haul Trucks	15 Days

Table 17
Anticipated Major Materials Quantities for Project B,
Alternative 2 – Expanded Footprint Alternative

Description	Quantity
Clearing and Grubbing	272.3 Acres
Levee Embankment Degrade	484,000 Cubic Yards
SB Cutoff Wall	504,500 Square Feet
Levee Embankment Fill	2,406,000 Cubic Yards
Borrow Site Excavation	2,334,500 Cubic Yards
Unsuitable Material Export	22,000 Cubic Yards
Class 2 Aggregate Surfacing	6,500 Tons

Table 18
Number of Trucks for Materials Delivery and Off Hauling – Project B, Alternative 2

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
31	225	17	36	36

Alternative 3 would construct a cutoff wall ranging between 39 feet and 124 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height with 1,900 feet of the levee being fully degraded. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep soil mixing (DSM) method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. Work

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for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 3, including staging and construction easement areas, is 155.1 acres.

The crew size for Alternative 3 during the peak is estimated at 110-120 people working on two fronts, 10-hour shifts, 2 shifts per day, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 19. For a listing of the anticipated material quantities associated with this alternative, see Table 20. The total number of anticipated trucks for materials delivery and off hauling is included in Table 21.

Table 19
Anticipated Equipment and Duration for Project B,
Alternative 3 – Optimized Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(8) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(4) Front-End Loaders	40 Days
		(5) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(2) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(2) Elevating Scrapers	60 Days
		(1) Water Truck	60 Days
3.	Levee Degrading/	(3) Excavators	45 Days
	Work Surface Construction	(15) Scrapers	45 Days
	(Lags 1. by 14 days)	(5) Vibratory Rollers	45 Days
		(3) Water Trucks	45 Days
		(7) Haul Trucks	45 Days
4.	Cutoff Wall Construction	(4) Hydraulic Excavators	80 Days
	(Lags 3. by 14 days)	(2) Front-End Loaders	80 Days
		(2) DSM Augers	30 Days
		(1) Extended Boom Pallet Loader	80 Days
		(4) 300 kW Generators	80 Days
		(2) Slurry Pumps	80 Days
		(5) Pickup Trucks	80 Days
		(3) Haul Trucks	80 Days
		(2) Water Trucks	80 Days

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Construction Phase	Number of Each Equipment Type	Duration of Use
5. Levee Reconstruction	(20) Scrapers	85 Days
(Lags 4. by 21 days)	(2) Motor Graders	85 Days
	(5) Vibratory Rollers	85 Days
	(3) Water Trucks	85 Days
6. Borrow Site Excavation	(2) Hydraulic Excavators	95 Days
(Concurrent with 5.)	(2) Front-End Loaders	95 Days
	(2) Water Trucks	95 Days
	(50) Haul Trucks	95 Days
7. Utility Reconstruction	(2) Backhoes	130 Days
	(2) Rubber Tire Crane	130 Days
	(2) Front End Loaders	130 Days
	(5) Pickup trucks	130 Days
	(2) Water Trucks	130 Days
8. Levee Resurfacing	(2) Motor Graders	22 Days
(Lags 5. by 96 days)	(2) Vibratory Rollers	22 Days
	(2) Haul Trucks	22 Days
	(1) Water Truck	22 Days
9. Hydroseeding	(2) Hydroseeding Trucks	20 Days
(Concurrent with 8.)		
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	18 Days
(Lags 9. by 10 days)	(2) Haul Trucks	18 Days

Table 20 Anticipated Major Materials Quantities for Project B, Alternative 3 – Optimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	94.1 Acres
Levee Embankment Degrade	931,900 Cubic Yards
SB Cutoff Wall	1,948,500 Square Feet
Levee Embankment Fill	1,086,500 Cubic Yards
Borrow Site Excavation	796,750 Cubic Yards
Unsuitable Material Export	520,250 Cubic Yards
Class 2 Aggregate Surfacing	12,000 Tons

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Table 21
Number of Trucks for Materials Delivery and Off Hauling – Project B, Alternative 3

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
119	400	17	36	36

PROJECT C, REACHES 13 THROUGH 24

Project C begins at Levee Station 845+00, near the north end of the Shanghai Bend Setback Levee, and continues north to Levee Station 1623+86 (corresponding to Reaches 13 through 24). The total length of the levee in this portion of the FRWL project is 77,886 linear feet.

Three alternatives have been reviewed as part of the Feather River West Levee Pre-Design Formulation Report. Alternative 1 would include the flattening of the waterside levee slope, the construction of a cutoff wall along the centerline of the existing levee to a varying depth, and the infilling of depressions and ditches at the landside levee toe. Alternative 2 would include a combination of seepage and stability berms along the landside toe of the levee, relief wells along the landside toe of the levee and shallow cutoff walls along the centerline of the levee for portions of the project. Alternative 3 is an optimized alternative, combining mitigation measures from both Alternative 1 and Alternative 2 to produce the most economically feasible project.

All three alternatives will require special consideration at the locations where the 5th Street bridge, State Highway 20 bridge, and the Union Pacific Railroad (UPRR) cross the levee. At these locations, soil-cement-bentonite cutoff walls will be constructed by either the Trench Remixing, Deep (TRD), jet grouting, or steel sheet pile method to a depth of approximately 31 to 53 feet. All three methods have similar crew sizes and equipment impacts, which are summarized in the cutoff wall section of the estimated equipment and duration table below.

Alternative 1 would construct a cutoff wall ranging between 21 and 105 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded approximately 50% of its overall height with approximately 2,600 feet of the levee being fully degraded. The cutoff wall would be constructed of soil-bentonite by either the conventional long-reach excavator or the deep mix method (DMM). After installation of the cutoff wall, the levee will be reconstructed to its original configuration. In addition to the cutoff wall, Alternative 1 would include approximately 11,150 feet of waterside slope flattening, approximately 5,100 feet of depression infill and approximately 1,500 feet of ditch lining. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction and reconstruction, relief well installation, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

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The total disturbed area for Alternative 1, including staging and construction easement areas, is 187.3 acres.

The crew size for Alternative 1 during the peak is estimated at 150-160 people working on three to four fronts, 10-hour shifts, 2 shifts per day for cutoff wall construction, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 22. For a listing of the anticipated material quantities associated with this alternative, see Table 23. The total number of anticipated trucks for materials delivery and off hauling is included in Table 24.

Table 22
Anticipated Equipment and Duration for Project C,
Alternative 1 – Minimized Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(4) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(2) Front-End Loaders	40 Days
		(4) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(2) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(2) Elevating Scrapers	60 Days
		(1) Water Truck	60 Days
3.	Levee Degrading/	(3) Excavators	35 Days
	Work Surface Construction	(14) Scrapers	35 Days
	(Lags 1. by 7 days)	(5) Vibratory Rollers	35 Days
		(4) Water Trucks	35 Days
		(7) Haul Trucks	35 Days
4.	Cutoff Wall Construction	(8) Hydraulic Excavators	60 Days
	(Lags 3. by 7 days)	(4) Front-End Loaders	60 Days
		(2) DSM Auger	60 Days
		(1) Extended Boom Pallet Loader	60 Days
		(6) 300 kW Generators	60 Days
		(4) Slurry Pumps	60 Days
		(6) Pickup Trucks	60 Days
		(3) Haul Trucks	60 Days
		(2) Water Trucks	60 Days
5.	Levee Reconstruction/	(10) Scrapers	130 Days
	Seepage Berm Construction	(2) Motor Graders	130 Days
	(Lags 4. by 22 days)	(5) Tractors with Discing Equipment	130 Days
		(5) Vibratory Rollers	130 Days
		(3) Water Trucks	130 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
6. Borrow Site Excavation	(2) Front-End Loaders	130 Days
(Concurrent with 5.)	(2) Water Trucks	130 Days
	(75) Haul Trucks	130 Days
7. Utility Reconstruction	(1) Hydraulic Excavator	130 Days
	(1) Haul Trucks	130 Days
	(2) Pickup Trucks	130 Days
	(1) Water Trucks	130 Days
8. Levee Resurfacing	(2) Motor Graders	24 Days
(Follows 5.)	(2) Vibratory Rollers	24 Days
	(2) Haul Trucks	24 Days
	(1) Water Truck	24 Days
9. Hydroseeding	(2) Hydroseeding Trucks	24 Days
(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	20 Days
(Follows 9.)	(2) Haul Trucks	20 Days

Table 23
Anticipated Major Materials Quantities for Project C,
Alternative 1 – Minimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	187.3 Acres
Levee Embankment Degrade	882,800 Cubic Yards
SB Cutoff Wall	3,137,100 Square Feet
Levee Embankment Fill	1,410,000 Cubic Yards
Borrow Site Excavation	531,300 Cubic Yards
Unsuitable Material Export	253,100 Cubic Yards
Class 2 Aggregate Surfacing	40,600 Tons

Table 24 Number of Trucks for Materials Delivery and Off Hauling – Project C, Alternative 1

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
191	1500	31	160	104

Alternative 2 would construct an undrained seepage berm ranging between 70 feet and 300 feet in width along the landside toe of the levee. An 8- to 10-foot high stability berm would be constructed along approximately 24,200 feet of the project. A shallow cutoff wall 20 feet in depth would be constructed along the levee centerline for approximately 14,700 feet of the

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project. Relief wells will be installed for approximately 37,400 feet of the project. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded by approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by the conventional, long-reach excavator method. After installation of the cutoff wall, the levee will be reconstructed to its original configuration. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, seepage and stability berm construction, relief well construction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 2, including staging and construction easement areas, is 344.9 acres.

The crew size for Alternative 2 during the peak is estimated at 200-210 people working on two fronts, 10-hour shifts, 2 shifts per day for cutoff wall construction, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 25. For a listing of the anticipated material quantities associated with this alternative, see Table 26. The total number of anticipated trucks for materials delivery and off hauling is included in Table 27.

Table 25
Anticipated Equipment and Duration for Project C,
Alternative 2 – Expanded Footprint Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(13) Elevating Scrapers	30 Days
Stripping	(7) Water Trucks	30 Days
	(7) Front-End Loaders	30 Days
	(13) Pickup Trucks	30 Days
2. Borrow Site Preparation	(4) Tractors with Discing Equipment	60 Days
(Concurrent with 1.)	(4) Elevating Scrapers	60 Days
	(2) Water Truck	60 Days
3. Levee Degrading/	(3) Excavators	20 Days
Work Surface Construction	(14) Scrapers	20 Days
(Lags 1. by 4 days)	(5) Vibratory Rollers	20 Days
	(4) Water Trucks	20 Days
	(7) Haul Trucks	20 Days

	Construction Phase	Number of Each Equipment Type	Duration of Use
4.	Cutoff Wall Construction	(4) Hydraulic Excavators	25 Days
	(Lags 3. by 7 days)	(2) Front-End Loaders	25 Days
		(1) DSM Auger	25 Days
		(1) Extended Boom Pallet Loader	25 Days
		(3) 300 kW Generators	25 Days
		(2) Slurry Pumps	25 Days
		(3) Pickup Trucks	25 Days
		(2) Haul Trucks	25 Days
		(1) Water Trucks	25 Days
5.	Levee Reconstruction/	(10) Scrapers	180 Days
	Seepage and Stability	(5) Motor Graders	180 Days
	Berm Construction	(5) Tractors with Discing Equipment	180 Days
	(Lags 4. by 2 days)	(5) Vibratory Rollers	180 Days
		(3) Water Trucks	180 Days
6.	Borrow Site Excavation	(4) Front-End Loaders	180 Days
	(Concurrent with 5.)	(4) Water Trucks	180 Days
		(75) Haul Trucks	180 Days
7.	Utility Reconstruction	(1) Hydraulic Excavator	130 Days
		(1) Haul Trucks	130 Days
		(2) Pickup Trucks	130 Days
		(1) Water Trucks	130 Days
8.	Levee Resurfacing	(4) Motor Graders	24 Days
	(Follows 5.)	(4) Vibratory Rollers	24 Days
		(2) Haul Trucks	24 Days
		(2) Water Truck	24 Days
9.	Hydroseeding	(2) Hydroseeding Trucks	24 Days
	(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10.	Demobilization/Cleanup	(1) Extended Boom Pallet Loader	20 Days
	(Follows 9.)	(2) Haul Trucks	20 Days

Table 26 Anticipated Major Materials Quantities for Project C, Alternative 2 – Expanded Footprint Alternative

Description	Quantity
Clearing and Grubbing	344.9 Acres
Levee Embankment Degrade	385,000 Cubic Yards
SB Cutoff Wall	451,200 Square Feet
Levee Embankment Fill	2,518,400 Cubic Yards
Borrow Site Excavation	2,681,200 Cubic Yards

Description	Quantity
Unsuitable Material Export	322,900 Cubic Yards
Class 2 Aggregate Surfacing	35,900 Tons

Table 27
Number of Trucks for Materials Delivery and Off Hauling – Project C, Alternative 2

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
28	1,200	31	160	104

Alternative 3 would construct a cutoff wall ranging between 21 and 105 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded by approximately 50% of its overall height with approximately 2,600 feet of the levee being fully degraded. The cutoff wall would be constructed of soil-bentonite by either the conventional long-reach excavator or the deep mix method (DMM). After installation of the cutoff wall, the levee will be reconstructed to its original configuration. In addition to the cutoff wall, Alternative 3 would include relief wells for approximately, 8200 feet, approximately 11,150 feet of waterside slope flattening, approximately 5,100 feet of depression infill and approximately 1,500 feet of ditch lining. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction and seepage berm construction, relief well installation, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 3, including staging and construction easement areas, is 187.3 acres.

The crew size for Alternative 3 during the peak is estimated at 150-160 people working on three to four fronts, 10-hour shifts, 2 shifts per day for cutoff wall construction, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 28. For a listing of the anticipated material quantities associated with this alternative, see Table 29. The total number of anticipated trucks for materials delivery and off hauling is included in Table 30.

Table 28
Anticipated Equipment and Duration for Project C,
Alternative 3 – Optimized Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(4) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(2) Front-End Loaders	40 Days
		(4) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(2) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(2) Elevating Scrapers	60 Days
		(1) Water Truck	60 Days
3.	Levee Degrading/	(3) Excavators	35 Days
	Work Surface Construction	(14) Scrapers	35 Days
	(Lags 1. by 7 days)	(5) Vibratory Rollers	35 Days
		(4) Water Trucks	35 Days
		(7) Haul Trucks	35 Days
4.	Cutoff Wall Construction	(8) Hydraulic Excavators	60 Days
	(Lags 3. by 7 days)	(4) Front-End Loaders	60 Days
		(2) DSM Auger	60 Days
		(1) Extended Boom Pallet Loader	60 Days
		(6) 300 kW Generators	60 Days
		(4) Slurry Pumps	60 Days
		(6) Pickup Trucks	60 Days
		(3) Haul Trucks	60 Days
		(2) Water Trucks	60 Days
5.	Levee Reconstruction/	(10) Scrapers	130 Days
	Seepage Berm Construction	(2) Motor Graders	130 Days
	(Lags 4. by 22 days)	(5) Tractors with Discing Equipment	130 Days
		(5) Vibratory Rollers	130 Days
		(3) Water Trucks	130 Days
6.	Borrow Site Excavation	(2) Front-End Loaders	130 Days
	(Concurrent with 5.)	(2) Water Trucks	130 Days
		(75) Haul Trucks	130 Days
7.	Utility Reconstruction	(1) Hydraulic Excavator	130 Days
		(1) Haul Trucks	130 Days
		(2) Pickup Trucks	130 Days
		(1) Water Trucks	130 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
8. Levee Resurfacing	(2) Motor Graders	24 Days
(Follows 5.)	(2) Vibratory Rollers	24 Days
	(2) Haul Trucks	24 Days
	(1) Water Truck	24 Days
9. Hydroseeding	(2) Hydroseeding Trucks	24 Days
(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	20 Days
(Follows 9.)	(2) Haul Trucks	20 Days

Table 29
Anticipated Major Materials Quantities for Project C,
Alternative 3 – Optimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	187.3 Acres
Levee Embankment Degrade	882,800 Cubic Yards
SB Cutoff Wall	3,175,000 Square Feet
Levee Embankment Fill	1,410,000 Cubic Yards
Borrow Site Excavation	531,300 Cubic Yards
Unsuitable Material Export	253,100 Cubic Yards
Class 2 Aggregate Surfacing	40,600 Tons

Table 30 Number of Trucks for Materials Delivery and Off Hauling – Project C, Alternative 3

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
193	1,500	31	160	104

PROJECT D, REACHES 26 THROUGH 41

Project D begins at Levee Station 1674+37 and continues north Levee Station 2368+00. The total length of the levee in this portion of the FRWL project is 69,363 linear feet.

Three alternatives have been reviewed as part of the Feather River West Levee Pre-Design Formulation Report. Alternative 1 would include the flattening of the waterside levee slope, the construction of a cutoff wall along the centerline of the existing levee to a varying depth, and the infilling of depressions and ditches at the landside levee toe. Alternative 2 would include a combination of seepage and stability berms along the landside toe of the levee, relief wells along the landside toe of the levee and shallow cutoff walls along the centerline of the levee for

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portions of the project. In addition, Alternative 2 will include the filling of the existing canal adjacent to the levee in Reaches 26, 27, and 28 with water. This will require the construction of regulating structures within the canal to maintain the water level within the canal. Alternative 3 is an optimized alternative, combining mitigation measures from both Alternative 1 and Alternative 2 to produce the most economically feasible project.

All three alternatives will require construction of a cutoff wall at the East Gridley Road crossing. A 70-foot deep soil-cement-bentonite cutoff wall constructed by either the Trench Remixing, Deep (TRD), jet grouting, or steel sheet pile method. All three methods have similar crew sizes and equipment impacts, which are summarized in the cutoff wall section of the estimated equipment and duration table below.

Alternative 1 would construct a cutoff wall ranging between 18 feet and 97 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded by approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep mix method (DSM). After installation of the cutoff wall, the levee will be reconstructed to its original configuration, with some areas including the flattening of the landside slope. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 1, including staging and construction easement areas, is 145.4 acres.

The crew size for Alternative 1 during the peak is estimated at 150-160 people working on three fronts, 10-hour shifts, 2 shifts per day for cutoff wall construction, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 31. For a listing of the anticipated material quantities associated with this alternative, see Table 32. The total number of anticipated trucks for materials delivery and off hauling is included in Table 33.

Table 31
Anticipated Equipment and Duration for Project D,
Alternative 1 – Minimized Footprint Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(3) Elevating Scrapers	40 Days
Stripping	(2) Water Trucks	40 Days
	(2) Front-End Loaders	40 Days
	(3) Pickup Trucks	40 Days

	Construction Phase	Number of Each Equipment Type	Duration of Use
2.	Borrow Site Preparation	(4) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(4) Elevating Scrapers	60 Days
		(2) Water Truck	60 Days
3.	Levee Degrading/	(3) Excavators	25 Days
	Work Surface Construction	(14) Scrapers	25 Days
	(Follows 1.)	(5) Vibratory Rollers	25 Days
		(3) Water Trucks	25 Days
		(7) Haul Trucks	25 Days
4.	Cutoff Wall Construction	(6) Hydraulic Excavators	75 Days
	(Lags 3. by 14 days)	(3) Front-End Loaders	75 Days
		(2) DSM Auger	75 Days
		(1) Extended Boom Pallet Loader	75 Days
		(5) 300 kW Generators	75 Days
		(3) Slurry Pumps	75 Days
		(5) Pickup Trucks	75 Days
		(3) Haul Trucks	75 Days
		(2) Water Trucks	75 Days
5.	Levee Reconstruction	(10) Scrapers	90 Days
	(Lags 4. by 22 days)	(5) Motor Graders	90 Days
		(5) Tractors with Discing Equipment	90 Days
		(5) Vibratory Rollers	90 Days
		(3) Water Trucks	90 Days
6.	Borrow Site Excavation	(3) Front-End Loaders	90 Days
	(Concurrent with 5.)	(3) Water Trucks	90 Days
		(75) Haul Trucks	90 Days
7.	Utility Reconstruction	(1) Hydraulic Excavator	130 Days
		(1) Haul Trucks	130 Days
		(2) Pickup Trucks	130 Days
		(1) Water Trucks	130 Days
8.	Levee Resurfacing	(2) Motor Graders	24 Days
	(Follows 5.)	(2) Vibratory Rollers	24 Days
		(2) Haul Trucks	24 Days
		(1) Water Truck	24 Days
9.	Hydroseeding	(2) Hydroseeding Trucks	24 Days
	(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10	. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	20 Days
	(Follows 9.)	(2) Haul Trucks	20 Days

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Table 32
Anticipated Major Materials Quantities for Project D,
Alternative 1 – Minimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	145.4 Acres
Levee Embankment Degrade	433,200 Cubic Yards
SB Cutoff Wall	3,239,100 Square Feet
Levee Embankment Fill	1,065,300 Cubic Yards
Borrow Site Excavation	330,100 Cubic Yards
Unsuitable Material Export	14,000 Cubic Yards
Class 2 Aggregate Surfacing	43,300 Tons

Table 33
Number of Trucks for Materials Delivery and Off Hauling – Project D, Alternative 1

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
197	1,500	44	275	76

Alternative 2 would construct an undrained seepage berm ranging between 50 feet and 300 feet in width along the landside toe of the levee. A 4- to 10-foot-tall stability berm would be constructed along approximately 38,600 feet of the project. Approximately 1,300 feet of the existing levee will need to be removed and reconstructed with a zoned filter at the base in combination with a seepage berm. Approximately 15,100 feet of canal will be infilled. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, seepage and stability berm construction, borrow site excavation, utility relocation and reconstruction, roadway reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 2, including staging and construction easement areas, is 241.1 acres.

The crew size for Alternative 2 during the peak is estimated at 150-160 people working one 10-hour shift, six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 34. For a listing of the anticipated material quantities associated with this alternative, see Table 35. The total number of anticipated trucks for materials delivery and off hauling is included in Table 36.

Table 34
Anticipated Equipment and Duration for Project D,
Alternative 2 – Expanded Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(5) Elevating Scrapers	40 Days
	Stripping	(3) Water Trucks	40 Days
		(3) Front-End Loaders	40 Days
		(5) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(4) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(4) Elevating Scrapers	60 Days
		(2) Water Truck	60 Days
3.	Levee Degrading/	No Task	No Task
	Work Surface Construction		
	(N/A		
4.	Cutoff Wall Construction	No Task	No Task
	(N/A)		
5.	Levee Reconstruction/	(10) Scrapers	185 Days
	Seepage and Stability	(2) Motor Graders	185 Days
	Berm Construction	(2) Tractors with Discing Equipment	185 Days
	(Follows 2.)	(5) Vibratory Rollers	185 Days
		(3) Water Trucks	185 Days
6.	Borrow Site Excavation	(2) Front-End Loaders	185 Days
	(Concurrent with 5.)	(2) Water Trucks	185 Days
		(75) Haul Trucks	185 Days
7.	Utility Reconstruction	(1) Hydraulic Excavator	130 Days
		(1) Haul Trucks	130 Days
		(2) Pickup Trucks	130 Days
		(1) Water Trucks	130 Days
8.	Levee Resurfacing	(2) Motor Graders	24 Days
	(Follows 6.)	(2) Vibratory Rollers	24 Days
		(2) Haul Trucks	24 Days
		(1) Water Truck	24 Days
9.	Hydroseeding	(2) Hydroseeding Trucks	24 Days
	(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10	. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	15 Days
	(Follows 9.)	(2) Haul Trucks	15 Days

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Table 35
Anticipated Major Materials Quantities for Project D,
Alternative 2 – Expanded Footprint Alternative

Description	Quantity
Clearing and Grubbing	241.1Acres
Levee Embankment Degrade	0 Cubic Yards
SB Cutoff Wall	0 Square Feet
Levee Embankment Fill	1,363,700 Cubic Yards
Borrow Site Excavation	601,500 Cubic Yards
Unsuitable Material Export	29,000 Cubic Yards
Class 2 Aggregate Surfacing	43,300 Tons

Table 36
Number of Trucks for Materials Delivery and Off Hauling – Project D, Alternative 2

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
89	1,500	44	275	76

Alternative 3 would construct a cutoff wall ranging between 18 feet and 97 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall and to maintain stability of the levee, the levee will be degraded by approximately 50% of its overall height. The cutoff wall would be constructed of soil-bentonite by either the conventional, long-reach excavator or the deep mix method (DSM). After installation of the cutoff wall, the levee will be reconstructed to its original configuration except in those locations where the levee slopes will be flattened. Approximately 1,300 feet of levee would be degraded and reconstructed with a 5 to 1 slope (horizontal to vertical). Approximately 9,500 feet of the landside levee slope will be flattened where the existing canal is adjacent to the levee. Work for this alternative is to include levee stripping, clearing and grubbing, borrow site preparation, levee degrading, cutoff wall installation, levee reconstruction, borrow site excavation, utility relocation and reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 3, including staging and construction easement areas, is 145.4 acres.

The crew size for Alternative 3 during the peak is estimated at 150-160 people working on three fronts, 10-hour shifts, 2 shifts per day cutoff wall construction only, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 37. For a listing of the anticipated material quantities associated with this alternative, see Table 38. The total number of anticipated trucks for materials delivery and off hauling is included in Table 39.

Table 37
Anticipated Equipment and Duration for Project D,
Alternative 3 – Optimized Footprint Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Clearing and Grubbing/	(3) Elevating Scrapers	40 Days
	Stripping	(2) Water Trucks	40 Days
		(2) Front-End Loaders	40 Days
		(3) Pickup Trucks	40 Days
2.	Borrow Site Preparation	(4) Tractors with Discing Equipment	60 Days
	(Concurrent with 1.)	(4) Elevating Scrapers	60 Days
		(2) Water Truck	60 Days
3.	Levee Degrading/	(3) Excavators	25 Days
	Work Surface Construction	(14) Scrapers	25 Days
	(Follows 1.)	(5) Vibratory Rollers	25 Days
		(3) Water Trucks	25 Days
		(7) Haul Trucks	25 Days
4.	Cutoff Wall Construction	(6) Hydraulic Excavators	75 Days
	(Lags 3. by 14 days)	(3) Front-End Loaders	75 Days
		(2) DSM Auger	75 Days
		(1) Extended Boom Pallet Loader	75 Days
		(5) 300 kW Generators	75 Days
		(3) Slurry Pumps	75 Days
		(5) Pickup Trucks	75 Days
		(3) Haul Trucks	75 Days
		(2) Water Trucks	75 Days
5.	Levee Reconstruction	(10) Scrapers	90 Days
	(Lags 4. by 22 days)	(5) Motor Graders	90 Days
		(5) Tractors with Discing Equipment	90 Days
		(5) Vibratory Rollers	90 Days
		(3) Water Trucks	90 Days
6.	Borrow Site Excavation	(3) Front-End Loaders	90 Days
	(Concurrent with 5.)	(3) Water Trucks	90 Days
		(75) Haul Trucks	90 Days
7.	Utility Reconstruction	(1) Hydraulic Excavator	130 Days
		(1) Haul Trucks	130 Days
		(2) Pickup Trucks	130 Days
		(1) Water Trucks	130 Days

Construction Phase	Number of Each Equipment Type	Duration of Use
8. Levee Resurfacing	(2) Motor Graders	24 Days
(Follows 5.)	(2) Vibratory Rollers	24 Days
	(2) Haul Trucks	24 Days
	(1) Water Truck	24 Days
9. Hydroseeding	(2) Hydroseeding Trucks	24 Days
(Concurrent with 8.)	(2) Pickup Trucks	24 Days
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	20 Days
(Follows 9.)	(2) Haul Trucks	20 Days

Table 38
Anticipated Major Materials Quantities for Project D,
Alternative 3 – Optimized Footprint Alternative

Description	Quantity
Clearing and Grubbing	145.4 Acres
Levee Embankment Degrade	433,200 Cubic Yards
SB Cutoff Wall	3,239,100 Square Feet
Levee Embankment Fill	1,065,300 Cubic Yards
Borrow Site Excavation	330,100 Cubic Yards
Unsuitable Material Export	14,000 Cubic Yards
Class 2 Aggregate Surfacing	43,300 Tons

Table 39 Number of Trucks for Materials Delivery and Off Hauling – Project D Alternative 3

Bentonite	Aggregate Surfacing	Pipe Material	Demolition Debris	CLSM Backfill
197	1,500	44	275	76

CUTOFF WALL GAP CLOSURES AND SPECIAL CROSSINGS

Three reaches of the Feather River West Levee, Reaches 14, 15, and 16, have had cutoff walls constructed along the approximate levee centerline. However, the projects skipped two major bridge crossings, the 5th Street bridge at Station 1007+00 and State Highway 20 bridge at Station 1025+20, creating gaps in the cutoff wall. In addition, there are two other crossings that require special consideration for the cutoff wall construction, the Union Pacific Railroad (UPRR) crossing at Station 1131+00 and the East Gridley Road at Station 1902+00.

As part of the technical memorandum titled "SBFCA, Fether River West Levee Rehabilitation Project, Alternatives Cost Analysis for Cutoff Walls at 5th Street, State Highway 20, UPRR, and

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East Gridley Road," three alternatives have been reviewed for these locations. Alternative 1 would construct an SCB cutoff wall by the Trench Remixing, Deep (TRD) Method. Alternative 2 would construct a cutoff wall by jet grouting using a mixture of cement and bentonite. Alternative 3 would construct a cutoff wall utilizing sheet piling.

Alternative 1 would construct a cutoff wall ranging between 40 feet and 70 feet in depth along the centerline of the levee. To facilitate construction of the cutoff wall, the levee would be degraded to create an adequate working platform for the TRD machine. Additionally, the existing roadways and railroad tracks would be removed and the existing bases would be graded to provide a working platform. The cutoff wall would be constructed of soil-cement-bentonite utilizing the TRD machine. After installation of the cutoff wall, the existing levee, roadway, and railroad tracks would be reconstructed to their original configuration. Work for this alternative is to include levee stripping, clearing and grubbing, roadway demolition, railroad track removal, levee degrading, cutoff wall installation, levee reconstruction, roadway reconstruction, railroad track replacement, utility reconstruction, levee resurfacing, hydroseeding, and demobilization and clean-up.

The total disturbed area for Alternative 1, including staging and construction easement areas, is 1.1 acres.

The crew size for Alternative 1 during the peak is estimated at 25-30 people working on one front, 12-hour shift, 1 shift per day, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 40. For a listing of the anticipated material quantities associated with this alternative, see Table 41. The total number of anticipated trucks for materials delivery and off hauling is included in Table 42.

Table 40
Anticipated Equipment and Duration for Cutoff Wall Gap Closures and Special Crossings,
Alternative 1 – SCB Cutoff Wall by TRD Method Alternative

Construction Phase	Number of Each Equipment Type	Duration of Use
1. Clearing and Grubbing/	(2) Elevating Scrapers	4 Days
Stripping	(1) Water Trucks	4 Days
	(1) Front-End Loaders	4 Days
	(4) Haul Trucks	4 Days
	(2) Pickup Trucks	4 Days
2. Borrow Site Preparation	(1) Tractors with Discing Equipment	1 Day
(Concurrent with 1.)	(1) Elevating Scrapers	1 Day
	(1) Water Truck	1 Day

Construction Phase	Number of Each Equipment Type	Duration of Use
3. Levee Degrading/	(1) Excavators	4 Days
Work Surface Construction	(1) Scrapers	4 Days
(Lags 1. by 1 day)	(2) Vibratory Rollers	4 Days
	(1) Water Trucks	4 Days
	(4) Haul Trucks	4 Days
4. Cutoff Wall Construction	(1) Front-End Loaders	15 Days
(Lags 3. by 1 day)	(1) TRD Machine	15 Days
	(1) Extended Boom Pallet Loader	15 Days
	(1) 300 kW Generators	15 Days
	(2) Pickup Trucks	15 Days
	(2) Haul Trucks	15 Days
	(1) Water Trucks	15 Days
5. Levee Reconstruction	(1) Scrapers	15 Days
(Lags 4. by 25 days)	(2) Motor Graders	15 Days
	(2) Vibratory Rollers	15 Days
	(1) Water Trucks	15 Days
6. Borrow Site Excavation	(1) Scrapers	4 Days
(Concurrent with 5.)	(1) Front-End Loaders	4 Days
	(1) Water Trucks	4 Days
	(4) Haul Trucks	4 Days
7. Utility Reconstruction	(2) Backhoes	10 Days
	(2) Front End Loaders	10 Days
	(2) Rubber Tire Crane	10 Days
	(3) Pickup trucks	10 Days
	(1) Water Trucks	10 Days
8. Levee Resurfacing	(2) Motor Graders	15 Days
(Follows 5.)	(2) Vibratory Rollers	15 Days
	(2) Haul Trucks	15 Days
	(1) Water Truck	15 Days
9. Hydroseeding	(1) Hydroseeding Trucks	1 Day
(Follows 8.)		
10. Demobilization/Cleanup	(1) Extended Boom Pallet Loader	1 Day
(Follows 9.)	(2) Haul Trucks	1 Day

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Table 41
Anticipated Major Materials Quantities for
Cutoff Wall Gap Closures and Special Crossings,
Alternative 1 – SCB Cutoff Wall by TRD Method Alternative

Description	Quantity
Clearing and Grubbing	1.1 Acres
Levee Embankment Degrade	7,420 Cubic Yards
SB Cutoff Wall	58,140 Square Feet
Levee Embankment Fill	8,900 Cubic Yards
Borrow Site Excavation	1,490 Cubic Yards
Class 2 Aggregate Base	210 Tons
Asphalt Concrete Paving	50 Tons

Table 42 Number of Trucks for Materials Delivery and Off Hauling Cutoff Wall Gap Closures and Special Crossings Alternative 1

Bentonite	Asphalt	Aggregate	Pipe	Demolition	CLSM
	Concrete	Surfacing	Material	Debris	Backfill
4	3	10	3	10	3

Alternative 2 would construct a cutoff wall ranging between 40 feet and 85 feet in depth along the centerline of the levee by jet grouting. A trench would be excavated to handle grouting spoils brought to the surface during the operation requiring removal of the existing roadway surfaces. The cutoff wall would be constructed using a mixture of cement and bentonite. After installation of the cutoff wall, the spoils trench would be backfilled and the existing roadway surface reconstructed. Work for this alternative is to include roadway demolition, trenching, cutoff wall installation, trench backfilling and compacting, roadway reconstruction, levee resurfacing, and demobilization and clean-up.

The total disturbed area for Alternative 2, including staging and construction easement areas, is 1.0 acres.

The crew size for Alternative 2 during the peak is estimated at 10-15 people working on one front, 12-hour shift, 1 shift per day, and six days a week. For a listing of the anticipated equipment and construction durations for this work, see Table 43. For a listing of the anticipated material quantities associated with this alternative, see Table 44. The total number of anticipated trucks for materials delivery and off hauling is included in Table 45.

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Table 43
Anticipated Equipment and Duration for Cutoff Wall Gap Closures and Special Crossings,
Alternative 2 – Jet Grouting Method Alternative

	Construction Phase	Number of Each Equipment Type	Duration of Use
1.	Roadway Demolition/	(1) Excavator	4 Days
	Levee Trenching	(1) Water Trucks	4 Days
		(2) Haul Trucks	4 Days
		(2) Pickup Trucks	4 Days
2.	Cutoff Wall Construction	(1) Front-End Loaders	50 Days
	(Lags 1. by 1 day)	(1) Jet Grouting Machine	50 Days
		(1) Extended Boom Pallet Loader	50 Days
		(1) 300 kW Generators	50 Days
		(2) Pickup Trucks	50 Days
		(2) Haul Trucks	50 Days
		(1) Water Trucks	50 Days
3.	Levee Reconstruction	(1) Excavator	4 Days
	(Lags 2. by 5 days)	(1) Pickup Truck	4 Days
		(1) Water Trucks	4 Days
4.	Levee Resurfacing	(1) Vibratory Roller	4 Days
	(Follows 3.)	(1) Water Trucks	4 Days
		(2) Haul Trucks	4 Days
5.	Demobilization/Cleanup	(1) Extended Boom Pallet Loader	1 Day
	(Follows 4.)	(2) Haul Trucks	1 Day

Table 44
Anticipated Major Materials Quantities for
Cutoff Wall Gap Closures and Special Crossings,
Alternative 1 – SCB Cutoff Wall by TRD Method Alternative

Description	Quantity
Levee Trenching	1,140 Feet
Jet Grout Cutoff Wall	65,320 Square Feet
Trench Backfill	460 Cubic Yards
Class 2 Aggregate Base	170 Tons
Asphalt Concrete Paving	20 Tons

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Table 45 Number of Trucks for Materials Delivery and Off Hauling Cutoff Wall Gap Closures and Special Crossings Alternative 2

Bentonite	Asphalt Concrete	Aggregate Surfacing
4	1	1

Alternative 1 Equipment Assumptions

					Pro	ject A									Proj	ject B									Projec	t C								Proje	ct D			$\overline{}$
Equipment	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8 9	9 10)	1 2	3	4	5	6	7 8	9	10
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	lo. N	o. N	o. No). N	o. No.	No.	No.	No.	No.	No. No.	No.	No.
Aerial Lifts																																						
Air Compressors																																						
Bore/Drill Rigs				1										1										2									2					
Cement and Mortar Mixers				2										2										4									3					
Concrete/Industrial Saws																																						
Cranes							2										2																					
Crawler Tractors																																						
Crushing/Proc. Equipment																																						
Excavators			3	4		2							3	4	ļ.	2							3	8			1					3	6			1		
Forklifts																																						
Generator Sets				3										4	ļ									6									5					
Graders					2	2		4							2			2							2			2						5		- 2	2	
Off-Highway Tractors		2										2										2			5							1		5				
Off-Highway Trucks									2										2										2								2	
Other Construction Equipment				1																																		
Other General Industrial Equipment																																						
Other Material Handling Equipment																																						
Pavers																																						
Paving Equipment																																						
Plate Compactors																																						
Pressure Washers																																						
Pumps																																						
Rollers			5		5	5		2					5		5			2					5		4			2				5	5	5		- 2	2	
Rough Terrain Forklifts										1				1						1				1						1			1					1
Rubber Tired Dozers																																						
Rubber Tired Loaders	4			2) 2	. 2				4			2		2	2				2			4		2					2		3		3			
Scrapers	8	2	15		20)					8	2	15		20						4	2	14		10						3 4	1 14	ļ	10				
Signal Boards																																						
Skid Steer Loaders																														1								
Surfacing Equipment																														Ī								
Sweepers/Scrubbers																														T		1					1	
Tractors/Loaders/Backhoes							2										2															1					1	
Trenchers																1														1		1					1	
Welders			i –	i –	1	1	1	1						1	1		i –	1		1										T								
Water Trucks	2	1	3	2	. 3	3 2	. 2	1	0	0	2	1	3	2	. 3	2	2	1	C	0	2	1	4	2	3	2	1	1	0	0	2 2	2 3	2	3	3	1 1	1 0	0

Workers (trips/day)	Α	В	С	D P	?												
Number	79.2	75.9	102.3	102.3 A	All .												
Distance (mi)	30	30	30	30 A	All .												
						Per Year				Per Day (y	r 1)			Per Day	yr 2)		
Trucks (trips/2 years)	Α	В	С	D P	?	Α	В	С	D	A B	c	: D)	Α	в с		D
Unsuitable Soil Disposal	2625	43354	21083	1166.7 1	., 3	1312.5	21677	10542	583.33	33	361	264	17	33	361	301	19
Bentonite	89	119	191	197	4	44.5	59.5	95.5	98.5	1.3	1.2	2.7	2.2	1.8	1.7	3.8	3.3
Aggregate Surfacing	425	400	1500	1500	8	212.5	200	750	750	18	20	63	63	21	25	63	63
Pipe Material	8	17	31	44	5	4	8.5	15.5	22	0.1	0.2	0.2	0.5	0.2	0.2	0.2	0.5
Demolition Debirs	60	36	160	275	10	30	18	80	137.5	3	3	8	14	3	2	8	14
CLSM Backfill	26	36	104	76	5	13	18	52	38	0.4	0.5	1	1	1	0.5	1	1
Borrow Fill	20333	66396	44250	27500	6	10167	33198	22125	13750	290	830	340	306	407	830	340	306
Distance (mi)	7	7	7	7													
Grading	Α	В	С	D													
Acres (2 years)	84	94	187	145													
Acres (1 year)	42	47	94	73													
Acres (1 year Clearing Phase)	35	40	80	62													
Acres (1 year Clearing Phase/day)	2	2	4	3													

 Acres (1 year Borrow Ex Phase)
 6
 7
 14
 11

 Acres (1 year Borrow Ex Phase/day)
 0.2
 0.2
 0.2
 0.2

Alternative 2 Equipment Assumptions

A B C D

183.1 272.3 344.9 241.1
91.55 136.15 172.45 120.55

 Acres (1 year Clearing Phase)
 78
 116
 147
 102

 Acres (1 year Clearing Phase/day)
 4
 6
 15
 5

Grading
Acres (2 years)
Acres (1 year)

					Р	roject <i>i</i>	A								Р	roject B	3									Project	t C									Project	D			
Equipment	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6		Road	8	9	10	1	2	3	4	5	6	7	8	9 1	LO	1	2	3			5 7	8	9	10
•	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No	No.	No.	No.	No.	No.	No.	No.	No.		No. N					No. N	lo. N	o. No.	No.	No	. No.
Aerial Lifts																																								
Air Compressors																																								
Bore/Drill Rigs				1																					1															
Cement and Mortar Mixers				1										2											2															
Concrete/Industrial Saws																																								
Cranes							2																																	
Crawler Tractors																																								
Crushing/Proc. Equipment																																								
Excavators			1	2	! 2	2 4	4						1	4		2	2							3	4			1										1		
Forklifts																																								
Generator Sets				2	:									2											3															1
Graders					5	5									5			2								5			4							5				
Off-Highway Tractors		4										4											4			5							4			2				
Off-Highway Trucks									2											2										2										2
Other Construction Equipment				1																																				
Other General Industrial Equipment																																								
Other Material Handling Equipment																																								
Pavers																																								
Paving Equipment																		1																						
Plate Compactors																																								
Pressure Washers																																								
Pumps																																								
Rollers			2		5	5							2		5			2						5		5			4							5				
Rough Terrain Forklifts										1				1							1				1						1									1
Rubber Tired Dozers											4																													
Rubber Tired Loaders	4	0		1		4	4 2							1		4	2					7			2		4					3					2			
Scrapers	8	4	2		25	5					8	4	2		25							13	4	14		10						5	4			10				1
Signal Boards																																								1
Skid Steer Loaders					1																																			1
Surfacing Equipment						1																																		\top
Sweepers/Scrubbers						1																																		\top
Tractors/Loaders/Backhoes						1	2										2																							\top
Trenchers						1																																		\top
Welders			1	l	1		†																																	+
Water Trucks	2	2	2	1	. 4	1 4	4 2		0	0	2	2	1	1	4	4	2	1		0	0	7	2	4	1	3	4	1	2	0	0	3	2			3	2	1		0 0

Workers (trips/day)	A B	C	D P3	?													
Number	132 128	7 135.3	102.3 Al	I													
Distance (mi)	30 3	0 30	30 Al	II													
					Per Year				Per Day	(yr 1)			Per Day	y (yr 2)			
Trucks (trips/2 years)	A B	С	D P	?	Α	В	С	D	Α	В	C I	D	Α	В	С	D	
Unsuitable Soil Disposal	6.25 1833	.3 26908	2416.7 1,	3	3	917	13454	1208	0.1	29	673	60	0	31	448	60	
Bentonite	1 3	1 28	197	4	0	16	14	0		0.5	0.9			0.8	1.4		
Aggregate Surfacing	50 22	5 1200	1500	8	0	113	600	0		6	50			6	50		Assigned to roadway
Pipe Material	8 1	.7 31	44	5	4	9	16	22	0.0	0.1	0.1	0.2	0.0	0.2	0.2	0.2	
Demolition Debirs	60 3	6 160	275	10	30	18	80	138	3	2	8	14	3	2	8	14	
CLSM Backfill	26 3	6 104	76	5	13	18	52	38	0.1	0.2	0.5	0.4	0.1	0.3	1	0.4	
Borrow Fill	135667 19454	2 223433	50125	6	67833.3	97270.8	111717	25062.5	754	1057	1016	269	848	1769	1596	272	
Distance (mi)	7	7 7	7														

 Acres (1 year Borrow Ex Phase)
 14
 20
 26
 18

 Acres (1 year Borrow Ex Phase/day)
 0.2
 0.2
 0.2
 0.2

Alternative 3 Equipment Assumptions

					Proj	ect A									Proje	ct B								Pro	oject C								Р	roject	D			1
Equipment	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4 5	6	7	8	9	10	1	2	3		5 6		8	9	
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No. No	. No	. No.	No.	No.	No.	No. N	o. N	No. N	lo. N	lo. N	o. No.	No.	No.	No.
Aerial Lifts																																						
Air Compressors																																						
Bore/Drill Rigs				1										2										2									2					
Cement and Mortar Mixers				2										2										4									3					
Concrete/Industrial Saws																																						
Cranes							2										2																					
Crawler Tractors																																						
Crushing/Proc. Equipment																																						
Excavators			3	5		2	2						3	4		2							3	8		1						3	6		- 1	1		
Forklifts																																						
Generator Sets				4										4										6									5					
Graders					2			2							2			2							2		2							5		2		
Off-Highway Tractors		2										2										2			5						4			5				
Off-Highway Trucks									2										2									2									2	
Other Construction Equipment				0																																		
Other General Industrial Equipment																																						
Other Material Handling Equipment																																						
Pavers																																						
Paving Equipment																																						
Plate Compactors																																						
Pressure Washers																																						
Pumps																																						
Rollers			5	5	5			2					5		5			2					5		5		2					5		5		2		
Rough Terrain Forklifts				1						1				1						1				1					1				1					1
Rubber Tired Dozers											4																											
Rubber Tired Loaders	4			2		2	2							2		2	2				2			4		2				2			3		3			
Scrapers	8	2	15	5	20						8	2	15		20						4	2	14	1	.0	0				3	4	14		10				
Signal Boards																																						
Skid Steer Loaders																																						
Surfacing Equipment																																						
Sweepers/Scrubbers																																						
Tractors/Loaders/Backhoes							2										2																					
Trenchers																																						
Welders																																						
Water Trucks	2	1	3	2	3	2	. 2	. 1	0	0	2	1	3	2	3	2	2	1	0	0	2	1	4	2	3	2 1	1	0	0	2	2	3	2	3	3 :	1 1	0	0

Workers (trips/day)	Α	В	С	D P?													
Number	79.2	75.9	102.3	102.3 All													
Distance (mi)	30	30	30	30 All													
						Per Year				Per Day (y	/r 1)			Per Day (y	2)		
Trucks (trips/2 years)	Α	В	С	D P?		Α	В	С	D	A E	з с	D		A B	C	. D)
Unsuitable Soil Disposal	2145.8	43354	21092	1166.7 1, 3	3	1072.9	21677	10546	583.33	15	482	264	29	15	542	301	29
Bentonite	78	119	193	197	4	39	59.5	96.5	98.5	1	1	3	2	2	2	4	4
Aggregate Surfacing	350	400	1500	1500	8	175	200	750	750	15	17	63	63	15	20	63	63
Pipe Material	8	17	31	44	5	4	8.5	15.5	22	0.1	0.2	0.2	0.4	0.2	0.2	0.2	0.4
Demolition Debirs	60	36	160	275	10	30	18	80	137.5	2	2	8	14	2	2	8	14
CLSM Backfill	26	36	104	76	5	13	18	52	38	0.4	0.4	1	1	1	0.5	1	1
Borrow Fill	23021	66396	44275	27508	6	11510	33198	22138	13754	460	604	341	229	460	830	341	229
Distance (mi)	7	7	7	7													
Grading	Α	В	С	D													
Acres (2 years)	87.2	94.1	187.3	145.4													
Acres (1 year)	43.6	47.05	93.65	72.7													
Acres (1 year Clearing Phase)	37	40	80	62													
Acres (1 year Clearing Phase/day)	2	2	4	6													

 Acres (1 year Borrow Ex Phase)
 7
 7
 14
 11

 Acres (1 year Borrow Ex Phase/day)
 0.3
 0.1
 0.2
 0.2

Alternative 1 Construction Schedule and Daily Output

														Project A														
Construction Phase							2014													20	15							
Construction rhase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
1. Clearing and Grubbing/ Stripping	5/15/2014	6/4/2014	20	0.9	14.8	71.9	192.1	27.4	7.4	20.0	10.9	6.7	4.2	17314.0	5/15/2015	6/4/2015	20	0.9	14.57	71.67	186.8	27.2	7.211	20.0	10.7	6.577	4.2	17290
2. Borrow Site Preparation	5/15/2014	6/14/2014	30	1.4	6.3	46.4	50.8	2.5	2.5	0.0	2.1	2.1	0.0	8940.3	5/15/2015	6/14/2015	30	1.4	5.934	43.34	48.99	2.46	2.46	0	2.017	2.017	0	8939.98
3. Levee Degrading/ Work Surface Construction	6/12/2014	7/2/2014	20	0.9	26.7	126.2	330.7	13.9	13.9	0.0	12.7	12.7	0.0	29072.8	6/12/2015	7/2/2015	20	0.9	26.27	126	321.9	13.54	13.54	0	12.4	12.4	0	29045.5
4. Cutoff Wall Construction	7/14/2014	8/18/2014	35	1.6	6.0	34.7	63.6	3.1	3.1	0.0	2.9	2.9	0.0	6914.7	7/14/2015	8/8/2015	25	1.1	5.804	34.57	61.09	2.972	2.972	0	2.73	2.73	0	6938.25
5. Levee Reconstruction/ Seepage Berm Construction	8/13/2014	9/17/2014	35	1.6	35.0	159.8	422.7	18.0	18.0	0.0	16.5	16.5	0.0	35040.6	8/13/2015	9/7/2015	25	1.1	34.53	159.8	413.3	17.59	17.59	0	16.18	16.18	0	35065.2
6. Borrow Site Excavation	8/13/2014	9/17/2014	35	1.6	4.5	23.1	117.7	5.2	3.2	2.0	2.9	2.5	0.4	17846.0	8/13/2015	9/7/2015	25	1.1	5.05	25.48	141.8	5.8	3.774	2	3.2	2.787	0.4	23792.5
7. Utility Reconstruction	7/14/2014	9/17/2014	65	3.0	5.3	42.2	37.9	1.9	1.9	0.0	1.5	1.5	0.0	7961.5	7/14/2015	9/17/2015	65	3.0	5.491	39.16	40.91	2.308	2.308	0	1.876	1.876	0	7962.9
8. Levee Resurfacing	10/1/2014	10/13/2014	12	0.5	5.4	17.7	56.6	3.1	3.1	0.0	2.8	2.8	0.0	4225.8	9/17/2015	9/27/2015	10	0.5	5.37	17.69	56.39	3.091	3.091	0	2.807	2.807	0	4370.57
9. Hydroseeding	10/1/2014	10/13/2014	12	0.5	4.6	35.3	28.1	1.5	1.5	0.0	1.1	1.1	0.0	7548.1	9/17/2015	9/23/2015	6	0.3	4.268	32.33	26.93	1.427	1.427	0	1.067	1.067	0	7550.13
10. Demobilization/Cleanup	10/17/2014	10/27/2014	10	0.5	0.3	2.1	4.1	0.2	0.2	0.0	0.2	0.2	0.0	531.0	9/25/2015	10/5/2015	10	0.5	0.274	2.127	3.915	0.197	0.197	0	0.176	0.176	0	529.348

														Project B														
Construction Phase							2014													20	15							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
. Clearing and Grubbing/ Stripping	5/15/2014	6/4/2014	20	0.9	17.7	84.7	297.6	29.9	9.9	20.0	12.7	8.5	4.2	34654.3	5/15/2015	6/4/2015	20	0.9	17.06	82.67	282	29.5	9.482	20.0	12.3	8.115	4.2	34441.3
. Borrow Site Preparation	5/15/2014	6/14/2014	30	1.4	6.2	45.2	50.7	2.5	2.5	0.0	2.1	2.1	0.0	8744.1	5/15/2015	6/14/2015	30	1.4	5.847	42.35	48.89	2.439	2.439	0	2.008	2.008	0	8743.77
. Levee Degrading/ Work Surface Construction	6/12/2014	7/22/2014	40	1.8	29.6	139.0	436.2	16.4	16.4	0.0	14.5	14.5	0.0	46413.1	6/12/2015	7/22/2015	40	1.8	28.75	137	417.1	15.81	15.81	0	13.94	13.94	0	46196.7
I. Cutoff Wall Construction	7/14/2014	9/2/2014	50	2.3	6.2	36.1	63.2	3.2	3.2	0.0	3.0	3.0	0.0	7114.7	7/14/2015	8/18/2015	35	1.6	5.879	35.99	60.36	3.034	3.034	0	2.787	2.787	0	7138.32
Levee Reconstruction/ Seepage Berm Construction	8/13/2014	9/22/2014	40	1.8	35.0	159.9	422.8	18.0	18.0	0.0	16.5	16.5	0.0	35051.2	8/13/2015	9/22/2015	40	1.8	34.52	159.8	413.2	17.59	17.59	0	16.18	16.18	0	35039.1
5. Borrow Site Excavation	8/13/2014	9/22/2014	40	1.8	9.3	44.2	291.4	9.4	7.4	2.0	5.9	5.4	0.4	46376.7	8/13/2015	9/22/2015	40	1.8	8.253	39.66	264.5	6.7	6.7	2	5.2	4.769	0.4	45897.9
'. Utility Reconstruction	7/14/2014	9/17/2014	65	3.0	5.2	41.0	37.8	1.9	1.9	0.0	1.5	1.5	0.0	7765.4	7/14/2015	9/17/2015	65	3.0	5.403	38.17	40.8	2.287	2.287	0	1.867	1.867	0	7766.69
3. Levee Resurfacing	10/8/2014	10/18/2014	10	0.5	3.2	10.8	35.3	1.9	1.9	0.0	1.7	1.7	0.0	2986.8	10/8/2015	10/16/2015	8	0.4	3.177	10.85	35.81	1.896	1.896	0	1.702	1.702	0	3235.66
). Hydroseeding	10/8/2014	10/18/2014	10	0.5	4.5	34.2	28.0	1.4	1.4	0.0	1.1	1.1	0.0	7352.0	10/8/2015	10/16/2015	8	0.4	4.181	31.34	26.83	1.406	1.406	0	1.059	1.059	0	7353.92
10. Demobilization/Cleanup	10/22/2014	10/28/2014	6	0.3	0.4	2.6	7.7	0.3	0.3	0.0	0.2	0.2	0.0	1112.2	10/20/2015	10/28/2015	8	0.4	0.357	2.495	7.105	0.273	0.273	0	0.228	0.228	0	1104.19

														Project C														
Construction Phase							2013													20)14	-						
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5	,	
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	СО	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	6/4/2013	20	0.9	10.8	49.8	187.3	46.6	6.6	40.0	13.9	5.6	8.3	21795.4	5/15/2014	6/4/2014	20	0.9	9.894	47.04	187.7	45.91	5.915	40	13.25	4.934	8.32	23720.1
2. Borrow Site Preparation	5/15/2013	6/14/2013	30	1.4	7.5	58.5	54.7	2.8	2.8	0.0	2.3	2.3	0.0	10312.1	5/15/2014	6/14/2014	30	1.4	6.936	54.15	51.67	7 2.677	2.677	0	2.145	2.145	0	10313.3
Levee Degrading/ Work Surface Construction	5/24/2013	6/13/2013	20	0.9	29.2	132.2	408.0	16.4	16.4	0.0	14.6	14.6	0.0	39738.9	5/26/2014	6/10/2014	15	0.7	27.5	129.4	397.9	15.19	15.19	0	13.47	13.47	<u>′</u> 0	41659.8
4. Cutoff Wall Construction	6/4/2013	7/9/2013	35	1.6	11.7	64.4	123.1	6.2	6.2	0.0	5.7	5.7	0.0	12857.2	6/4/2014	6/29/2014	25	1.1	10.84	64.14	114.5	5.611	5.611	0	5.154	5.154	٠ 0	12903.8
5. Levee Reconstruction/ Seepage Berm Construction	7/4/2013	9/7/2013	65	3.0	36.3	160.0	441.8	18.8	18.8	0.0	17.3	17.3	0.0	35086.4	7/3/2014	9/6/2014	65	3.0	34.99	159.9	422.9	17.97	17.97	0	16.53	16.53	0 د	35077.6
6. Borrow Site Excavation	7/4/2013	9/7/2013	65	3.0	5.3	25.0	133.7	6.1	4.1	2.0	3.2	3.2	0.4	19379.3	7/3/2014	9/6/2014	65	3.0	5.344	24.95	133.7	6.146	4.146	2	3.658	3.242	0.416	19379.3
7. Utility Reconstruction	6/25/2013	8/29/2013	65	3.0	3.9	41.7	10.0	0.9	0.9	0.0	0.5	0.5	0.0	6678.1	6/25/2014	8/29/2014	65	3.0	3.467	37.33	8.989	0.897	0.897	0	0.507	0.507	/ O	6679.53
8. Levee Resurfacing	10/3/2013	10/15/2013	12	0.5	3.9	13.5	51.6	2.5	2.5	0.0	2.2	2.2	0.0	5267.2	10/2/2014	10/14/2014	12	0.5	3.562	12.47	49.12	2.229	2.229	0	1.944	1.944	. 0	5258.74
9. Hydroseeding	10/3/2013	10/15/2013	12	0.5	5.7	47.4	31.5	1.7	1.7	0.0	1.3	1.3	0.0	8918.8	10/2/2014	10/14/2014	12	0.5	5.234	43.12	28.97	7 1.609	1.609	0	1.163	1.163	0 د	8921.11
10. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.4	2.5	6.3	0.3	0.3	0.0	0.3	0.3	0.0	796.1	10/20/2014	10/30/2014	10	0.5	0.331	2.337	5.75	0.248	0.248	0	0.215	0.215	0 د	795.193

														Project D														
County sties Phase							2013													20)14							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	6/4/2013	20	0.9	6.1	29.0	81.0	33.1	3.1	30.0	9.1	2.8	6.2	7108.7	5/15/2014	6/4/2014	20	0.9	5.879	28.8	77.9	32.95	2.949	30	8.92	2.68	6.24	7211.14
2. Borrow Site Preparation	5/15/2013	6/14/2013	30	1.4	11.6	78.1	105.1	5.0	5.0	0.0	4.2	4.2	0.0	14545.3	5/15/2014	6/14/2014	30	1.4	10.86	73.77	99.6	4.711	4.711	0	4.016	4.016	0	14546.2
3. Levee Degrading/ Work Surface Construction	6/12/2013	6/27/2013	15	0.7	26.1	118.6	321.6	13.7	13.7	0.0	12.6	12.6	0.0	26635.7	6/12/2014	6/22/2014	10	0.5	25.02	118.4	307.1	13	13	0	11.92	11.92	0	26734

4. Cutoff Wall Construction	7/2/2013	8/16/2013	45	2.0	9.4	52.3	99.4	5.0	5.0	0.0	4.6	4.6	0.0	10477.3	7/2/2014	8/1/2014	30	1.4	8.717	52.05	92.28	4.52	4.52	0	4.151	4.151	0	10524.1
5. Levee Reconstruction/ Seepage Berm Construction	8/1/2013	9/15/2013	45	2.0	25.9	110.5	300.4	13.9	13.9	0.0	12.8	12.8	0.0	23488.8	7/31/2014	9/14/2014	45	2.0	25.03	110.4	287.9	13.3	13.3	0	12.23	12.23	0	23482.2
6. Borrow Site Excavation	8/1/2013	9/15/2013	45	2.0	5.5	26.2	129.3	6.0	4.0	2.0	3.2	3.2	0.4	18268.7	7/31/2014	9/14/2014	45	2.0	4.324	21.32	119.9	5.104	3.104	2	2.756	2.34	0.416	18235
7. Utility Reconstruction	7/13/2013	9/16/2013	65	3.0	3.9	41.7	10.0	0.9	0.9	0.0	0.5	0.5	0.0	6678.1	7/14/2014	9/17/2014	65	3.0	3.467	37.33	8.989	0.897	0.897	0	0.507	0.507	0	6679.53
8. Levee Resurfacing	10/3/2013	10/15/2013	12	0.5	3.9	13.5	51.6	2.5	2.5	0.0	2.2	2.2	0.0	5267.2	10/2/2014	10/14/2014	12	0.5	3.467	37.33	8.989	0.897	0.897	0	0.507	0.507	0	6679.53
9. Hydroseeding	10/3/2013	10/15/2013	12	0.5	5.7	47.4	31.5	1.7	1.7	0.0	1.3	1.3	0.0	8918.8	10/2/2014	10/14/2014	12	0.5	5.234	43.12	28.97	1.609	1.609	0	1.163	1.163	0	8921.11
10. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.5	2.8	8.4	0.4	0.4	0.0	0.3	0.3	0.0	1113.7	10/20/2014	10/30/2014	10	0.5	0.384	2.571	7.679	0.295	0.295	0	0.247	0.247	0	1112.2

Alternative 2 Construction Schedule and Daily Output

														Project A														
Construction Phase							2014													20)15							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		1
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2014	6/4/2014	20	0.9	14.5	70.6	181.6	47.1	7.1	40.0	14.9	6.6	8.3	15581.0	5/15/2015	6/4/2015	20	0.9	14.32	70.57	177.3	46.98	6.984	40	14.7	6.424	8.3	15576
2. Borrow Site Preparation	5/15/2014	6/6/2014	22	1.0	7.8	39.2	95.9	4.1	4.1	0.0	3.7	3.7	0.0	8465.8	5/15/2015	6/14/2015	30	1.4	7.666	39.22	92.89	3.929	3.929	0	3.6134	3.613	0.0	8462.1
3. Levee Degrading/ Work Surface Construction	6/12/2014	6/22/2014	10	0.5	4.3	20.4	50.6	2.3	2.3	0.0	2.1	2.1	0.0	4409.3													0.0	
4. Cutoff Wall Construction	6/26/2014	7/6/2014	10	0.5	3.9	22.5	41.0	2.0	2.0	0.0	1.9	1.9	0.0	4466.4													0.0	
5. Levee Reconstruction/ Seepage Berm Construction	6/12/2014	9/10/2014	90	4.1	46.9	212.2	561.6	24.2	24.2	0.0	22.2	22.2	0.0	46256.5	6/12/2015	9/10/2015	90	4.1	46.33	212.1	549.1	23.68	23.68	0	21.786	21.79	0.0	46241
6. Borrow Site Excavation	6/16/2014	9/14/2014	90	4.1	10.6	53.1	291.6	9.8399	7.8	2.0	6.4	5.9	0.4	44898.3	6/26/2015	9/14/2015	80	3.6	10.36	52.1	293.5	7.783	7.783	0	6.1	5.733	0.4	49362
7. Utility Reconstruction	7/14/2014	9/17/2014	65	3.0	3.0	15.4	35.1	1.4	1.4	0.0	1.3	1.3	0.0	3254.2	7/14/2015	9/12/2015	60	2.7	3.39	15.43	38.36	1.813	1.813	0	1.6658	1.666	0	3254
8. Levee Resurfacing																												1
9. Hydroseeding	10/20/2014	10/30/2014	10	0.5	2.2	8.6	25.2	1.0	1.0	0.0	0.9	0.9	0.0	2840.8	10/16/2015	10/26/2015	10	0.5	2.167	8.602	24.39	0.932	0.932	0	0.857	0.857	0	2841.2
10. Demobilization/Cleanup	10/16/2014	10/28/2014	12	0.5	0.3	2.1	4.1	0.2	0.2	0.0	0.2	0.2	0.0	531.0	10/16/2015	10/26/2015	10	0.5	0.274	2.127	3.915	0.197	0.197	0	0.176	0.176	0	529.35

														Project B														
Construction Phase							2014													2	015		•					,
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	СО	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2014	6/4/2014	20	0.9	17.9	76.9	220.3	69.1	9.1	60.0	20.8	8.3	12.5	18242.1	5/15/2015	6/4/2015	20	0.9	17.67	76.83	215.8	519.7	8.921	60	20.6	8.153	12.5	18324
2. Borrow Site Preparation	5/15/2014	6/4/2014	20	0.9	7.8	39.2	95.9	4.1	4.1	0.0	3.7	3.7	0.0	8465.8	5/15/2015	6/14/2015	30	1.4	7.666	39.22	92.89	3.929	3.929	0	3.6134	3.613	0.0	8462.1
3. Levee Degrading/ Work Surface Construction	6/12/2014	6/24/2014	12	0.5	4.6	21.5	59.7	2.5	2.5	0.0	2.3	2.3	0.0	5909.8	6/12/2015	6/22/2015	10	0.5	4.478	21.38	58.13	2.469	2.469	0	2.2182	2.218	0.0	5996.3
4. Cutoff Wall Construction	6/30/2014	7/30/2014	30	1.4	4.0	23.1	40.5	2.1	2.1	0.0	2.0	2.0	0.0	4469.1	6/26/2015	7/16/2015	20	0.9	3.808	23.04	38.89	2.016	2.016	0	1.8523	1.852	0.0	4484.3
5. Levee Reconstruction/ Seepage Berm Construction	6/12/2014	9/5/2014	85	3.9	46.0	206.6	551.0	23.7	23.7	0.0	21.8	21.8	0.0	45042.3	6/12/2015	8/6/2015	55	2.5	45.44	206.5	539	23.19	23.19	0	21.336	21.34	0.0	45038
6. Borrow Site Excavation	6/12/2014	9/12/2014	92	4.2	12.4	59.4	378.8	11.695	9.7	2.0	7.6	7.1	0.4	59761.6	6/26/2015	8/20/2015	55	2.5	16.45	77.4	550.8	13.67	13.67	0	10.0	9.603	0.4	96346
7. Utility Reconstruction	7/14/2014	9/17/2014	65	3.0	2.3	15.0	27.2	1.1	1.1	0.0	1.0	1.0	0.0	3196.2	7/14/2015	9/7/2015	55	2.5	2.725	14.99	30.67	1.498	1.498	0	1.3761	1.376	0	3196
X. Roadway Construction	9/20/2014	10/10/2014	20	0.9	3.4	12.9	35.1	2.0	2.0	0.0	1.8	1.8	0.0	2673.3	9/11/2015	10/1/2015	20	0.9	3.385	12.9	34.36	1.963	1.963	0	1.7949	1.795	0	2668.9
8. Levee Resurfacing																												
9. Hydroseeding	10/20/2014	10/28/2014	8	0.4	2.2	8.6	25.2	1.0	1.0	0.0	0.9	0.9	0.0	2840.8	9/11/2015	9/21/2015	10	0.5	2.167	8.602	24.39	0.932	0.932	0	0.857	0.857	0	2841.2
10. Demobilization/Cleanup	10/9/2014	10/19/2014	10	0.5	0.3	2.1	3.8	0.2	0.2	0.0	0.2	0.2	0.0	478.2	8/28/2015	9/7/2015	10	0.5	0.267	2.093	3.625	0.19	0.19	0	0.1713	0.171	0	477.09

														Project C														
County ation Phase							2013													20)14							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	5/25/2013	10	0.5	33.0	153.4	547.9	169.5	19.5	150.0	48.0	16.8	31.2	61385.5	5/15/2014	6/4/2014	20	0.9	27.78	133.8	443.2	165.2	15.22	150	44.4	13.25	31.2	49419
2. Borrow Site Preparation	5/15/2013	6/14/2013	30	1.4	8.2	39.3	100.9	4.3	4.3	0.0	4.0	4.0	0	8466.5	5/15/2014	6/14/2014	30	1.4	7.84	39.24	95.87	4.069	4.069	0	3.7418	3.742	0	8465.8
3. Levee Degrading/ Work Surface Construction	5/21/2013	5/31/2013	10	0.5	34.2	154.7	550.8	20.7	20.7	0.0	17.9	17.9	0	61392.3	6/12/2014	6/22/2014	10	0.5	28.79	135.1	445.2	16.34	16.34	0	14.273	14.27	0	49426
Cutoff Wall Construction	5/30/2013	6/14/2013	15	0.7	6.0	33.2	63.2	3.2	3.2	0.0	2.9	2.9	0	6591.0	6/26/2014	7/6/2014	10	0.5	5.546	33.07	58.66	2.894	2.894	0	2.6595	2.659	0	6611.8
5. Levee Reconstruction/ Seepage Berm Construction	5/23/2013	9/10/2013	110	5.0	25.9	110.5	300.1	13.9	13.9	0.0	12.8	12.8	0	23441.2	6/12/2014	8/21/2014	70	3.2	25.03	110.4	287.8	13.3	13.3	0	12.232	12.23	0	23466
5. Borrow Site Excavation	5/23/2013	9/10/2013	110	5.0	14.9	68.3	384.8	11.885	11.9	0.0	9.6	9.2	0.416	56547.1	6/26/2014	9/4/2014	70	3.2	16.21	74.77	541.9	15.38	13.38	2	10.0	9.63	0.416	87094
'. Utility Reconstruction	6/24/2013	8/28/2013	65	3.0	0.5	2.8	5.7	0.3	0.3	0.0	0.3	0.3	0.0	599.2	7/14/2014	9/17/2014	65	3.0	0.451	2.808	5.259	0.254	0.254	0	0.2333	0.233	0	599.19
3. Levee Resurfacing	10/3/2013	10/15/2013	12	0.5	6.8	22.8	76.5	4.1	4.1	0.0	3.7	3.7	0.0	6484.3	10/2/2014	10/14/2014	12	0.5	6.453	21.96	73.64	3.864	3.864	0	3.4701	3.47	0	6475.6
). Hydroseeding	10/3/2013	10/15/2013	12	0.5	2.4	8.6	27.3	1.1	1.1	0.0	1.0	1.0	0.0	2839.9	10/2/2014	10/14/2014	12	0.5	2.218	8.601	25.24	0.967	0.967	0	0.8896	0.89	0	2840.8
10. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.4	2.5	6.3	0.3	0.3	0.0	0.3	0.3	0.0	796.1	10/20/2014	10/30/2014	10	0.5	0.331	2.337	5.75	0.248	0.248	0	0.2146	0.215	0	795.19

														Project D														
Construction Phase							2013													20	014							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		,
	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	co	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	6/4/2013	20	0.9	8.1	32.7	89.0	53.733	3.7	50.0	13.7	3.3	10.4	8872.9	4/29/2014	5/19/2014	20	0.9	7.416	31.43	84.37	53.38	3.382	50	13.4	3.008	10.4	8865.4
2. Borrow Site Preparation	5/15/2013	6/4/2013	20	0.9	8.2	39.3	100.9	4.3	4.3	0.0	4.0	4.0	0.0	8466.5	4/29/2014	5/29/2014	30	1.4	7.84	39.24	95.87	4.069	4.069	0	3.7418	3.742	0	8465.8

3. Levee Degrading/ Work Surface Construction																												
4. Cutoff Wall Construction																												
5. Levee Reconstruction/ Seepage Berm Construction	6/12/2013	9/13/2013	93	4.2	24.6	102.8	284.8	13.1	13.1	0.0	12.1	12.1	0.0	21960.8	5/27/2014	8/27/2014	92	4.2	23.77	102.8	273.5	12.57	12.57	0	11.559	11.56	0	21954
6. Borrow Site Excavation	6/12/2013	9/13/2013	93	4.2	4.5	21.1	108.9	3.387	3.4	0.0	3.1	2.7	0.4	15620.4	6/10/2014	9/10/2014	92	4.2	3.495	16.94	101.9	4.607	2.607	2	2.4	1.94	0.416	15763
7. Utility Reconstruction	7/12/2013	9/15/2013	65	3.0	0.5	2.8	5.7	0.3	0.3	0.0	0.3	0.3	0.0	599.2	6/26/2014	8/30/2014	65	3.0	0.451	2.808	5.259	0.254	0.254	0	0.2333	0.233	0	599.19
8. Levee Resurfacing																												
9. Hydroseeding	10/21/2013	11/2/2013	12	0.5	2.4	8.6	27.3	1.1	1.1	0.0	1.0	1.0	0.0	2839.9	10/16/2014	10/28/2014	12	0.5	2.218	8.601	25.24	0.967	0.967	0	0.8896	0.89	0	2840.8
10. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.5	2.8	8.4	0.4	0.4	0.0	0.3	0.3	0.0	1113.7	10/2/2014	10/12/2014	10	0.5	0.384	2.571	7.679	0.295	0.295	0	0.2474	0.247	0	1112.2

Alternative 3 Construction Schedule and Daily Output

														Project A														
Construction Phase							2014													20	015							
Construction r nase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2014	6/4/2014	20	0.9	14.6	71.2	186.4	27.3	7.3	20.0	10.8	6.7	4.2	16373.5	5/15/2015	6/4/2015	20	0.9	14.44	71.08	181.6	27.1	7.088	20.0	10.7	6.494	4.2	16359.8
2. Borrow Site Preparation	5/15/2014	6/14/2014	30	1.4	3.9	19.6	47.9	2.0	2.0	0.0	1.9	1.9	0.0	4232.9	5/15/2015	6/14/2015	30	1.4	3.833	19.61	46.45	2.2	1.965	0.0	2.0	1.807	0.0	4231.04
3. Levee Degrading/ Work Surface Construction	6/12/2014	8/1/2014	50	2.3	26.5	125.5	325.0	13.7	13.7	0.0	12.6	12.6	0.0	28132.3	6/12/2015	8/1/2015	50	2.3	26.13	125.4	316.8	16.4	13.42	0.0	14.6	12.32	0.0	28115.2
4. Cutoff Wall Construction	7/14/2014	8/18/2014	35	1.6	6.6	38.9	68.2	3.5	3.5	0.0	3.2	3.2	0.0	7676.9	7/14/2015	8/8/2015	25	1.1	6.321	38.79	65.35	6.2	3.279	0.0	5.7	3.011	0.0	7726.8
5. Levee Reconstruction/ Seepage Berm Construction	8/13/2014	9/17/2014	35	1.6	35.0	159.8	422.7	18.0	18.0	0.0	16.5	16.5	0.0	35040.6	8/13/2015	9/7/2015	25	1.1	34.53	159.8	413.3	12.0	17.59	0.0	11.1	16.18	0.0	35065.2
6. Borrow Site Excavation	8/13/2014	9/7/2014	25	1.1	6.0	29.9	172.6	7.6	4.6	3.0	4.1	3.4	0.6	26847.5	8/13/2015	9/7/2015	25	1.1	5.451	27.26	157.2	7.1	4.14	3.0	3.7	3.035	0.6	26562.2
7. Utility Reconstruction	7/14/2014	9/17/2014	65	3.0	3.0	15.4	35.1	1.4	1.4	0.0	1.3	1.3	0.0	3254.2	7/14/2015	9/17/2015	65	3.0	3.39	15.43	38.36	1.8125	1.813	0	1.666	1.666	0	3253.96
8. Levee Resurfacing	10/1/2014	10/13/2014	12	0.5	3.1	10.6	33.7	1.9	1.9	0.0	1.7	1.7	0.0	2722.7	9/17/2015	9/29/2015	12	0.5	3.141	10.6	33.69	1.8562	1.856	0	1.682	1.682	0	2722.67
9. Hydroseeding	9/17/2014	9/29/2014	12	0.5	2.2	8.6	25.2	1.0	1.0	0.0	0.9	0.9	0.0	2840.8	9/17/2015	9/29/2015	12	0.5	2.167	8.602	24.39	0.9315	0.932	0	0.857	0.857	0	2841.18
10. Demobilization/Cleanup	10/3/2014	10/18/2014	15	0.7	0.3	2.1	3.8	0.2	0.2	0.0	0.2	0.2	0.0	478.2	10/5/2015	10/20/2015	15	0.7	0.267	2.093	3.625	0.1898	0.19	0	0.171	0.171	0	477.089

														Project B														
Construction Phase							2014													2	015		-			-	-	
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5	,	
	Start	End	Days	Mo	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	4/29/2014	5/19/2014	20	0.9	21.8	94.6	365.9	32.6	12.6	20.0	15.0	10.8	4.2	42176.1	4/29/2015	5/19/2015	20	0.9	21.54	93.95	364	32.5	12.46	20.0	14.7	10.55	4.2	45027.9
2. Borrow Site Preparation	4/29/2014	5/29/2014	30	1.4	3.9	19.6	47.9	2.0	2.0	0.0	1.9	1.9	0.0	4232.9	4/29/2015	5/29/2015	30	1.4	3.833	19.61	46.45	2.2	1.965	0.0	2.0	1.807	0.0	4231.04
Levee Degrading/ Work Surface Construction	5/27/2014	6/21/2014	25	1.1	30.6	143.7	475.1	17.4	17.4	0.0	15.2	15.2	0.0	52806.1	5/27/2015	6/16/2015	20	0.9	30.12	143	469.6	16.4	17.06	0.0	14.6	14.78	0.0	55655.6
4. Cutoff Wall Construction	6/10/2014	7/30/2014	50	2.3	6.6	39.9	69.5	3.4	3.4	0.0	3.1	3.1	0.0	8049.3	6/26/2015	7/26/2015	30	1.4	6.288	39.8	66.5	6.2	3.218	0.0	5.7	2.955	0.0	8098.07
5. Levee Reconstruction/ Seepage Berm Construction	7/10/2014	8/24/2014	45	2.0	35.0	159.8	422.7	18.0	18.0	0.0	16.5	16.5	0.0	35045.9	7/28/2015	9/6/2015	40	1.8	34.53	159.8	413.3	12.0	17.59	0.0	11.1	16.18	0.0	35065.2
6. Borrow Site Excavation	7/10/2014	9/3/2014	55	2.5	7.3	35.4	218.8	6.7	5.7	1.0	4.4	4.2	0.2	34442.6	7/28/2015	9/6/2015	40	1.8	8.253	39.66	264.5	7.7	6.7	1.0	5.0	4.769	0.2	45897.9
7. Utility Reconstruction	6/26/2014	8/30/2014	65	3.0	3.0	15.4	35.1	1.4	1.4	0.0	1.3	1.3	0.0	3254.2	6/26/2015	8/30/2015	65	3.0	3.39	15.43	38.36	1.8125	1.813	0	1.666	1.666	, 0	3253.96
8. Levee Resurfacing	9/11/2014	9/23/2014	12	0.5	3.2	10.7	34.3	1.9	1.9	0.0	1.7	1.7	0.0	2828.3	9/22/2015	10/2/2015	10	0.5	3.139	10.68	34.36	1.8617	1.862	0	1.678	1.678	, 0	2974.36
9. Hydroseeding	9/25/2014	10/5/2014	10	0.5	2.2	8.6	25.2	1.0	1.0	0.0	0.9	0.9	0.0	2840.8	9/22/2015	10/2/2015	10	0.5	2.167	8.602	24.39	0.9315	0.932	0	0.857	0.857	0	2841.18
10. Demobilization/Cleanup	10/9/2014	10/19/2014	10	0.5	0.3	2.1	3.8	0.2	0.2	0.0	0.2	0.2	0.0	478.2	10/6/2015	10/14/2015	8	0.4	0.267	2.093	3.625	0.1898	0.19	0	0.171	0.171	. 0	477.089

														Project C														
Construction Phase							2013													2	014		-					
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	6/4/2013	20	0.9	10.8	49.8	187.3	46.6	6.6	40	13.9	5.6	8.32	21795.4	5/15/2014	6/4/2014	20	0.9	9.894	47.04	187.7	45.915	5.915	40	13.25	4.934	8.32	23720.1
2. Borrow Site Preparation	5/15/2013	6/14/2013	30	1.4	4.1	19.6	50.4	2.2	2.2	0	2.0	2.0	0	4233.2	5/15/2014	6/14/2014	30	1.4	3.92	19.62	47.93	2.0345	2.035	0	1.871	1.871	0	4232.91
3. Levee Degrading/ Work Surface Construction	5/24/2013	6/13/2013	20	0.9	29.2	132.2	408.0	16.4	16.4	0	14.6	14.6	0	39738.9	5/26/2014	6/10/2014	15	0.7	27.5	129.4	397.9	15.193	15.19	0	13.47	13.47	0	41659.8
4. Cutoff Wall Construction	6/4/2013	7/9/2013	35	1.6	11.7	64.4	123.2	6.2	6.2	0	5.7	5.7	0	12873.0	6/4/2014	6/29/2014	25	1.1	10.84	64.15	114.5	5.6121	5.612	0	5.155	5.155	0	12914.4
5. Levee Reconstruction/ Seepage Berm Construction	7/4/2013	9/7/2013	65	3.0	22.6	100.0	267.0	12.0	12.0	0	11.1	11.1	0	21454.3	7/3/2014	9/6/2014	65	3.0	21.68	99.95	255	11.457	11.46	0	10.54	10.54	0	21449.4
6. Borrow Site Excavation	7/4/2013	9/7/2013	65	3.0	5.4	25.0	134.1	6.2	4.2	2	3.7	3.3	0.416	19432.2	7/3/2014	9/6/2014	65	3.0	4.1	19.62	124.1	5.1431	3.143	2	2.733	2.317	0.416	19408.1
7. Utility Reconstruction	6/25/2013	8/29/2013	65	3.0	0.5	2.8	5.7	0.3	0.3	0.0	0.3	0.3	0.0	599.2	6/25/2014	8/29/2014	65	3.0	0.451	2.808	5.259	0.2545	0.254	0	0.233	0.233	0	599.187
8. Levee Resurfacing	10/3/2013	10/15/2013	12	0.5	3.9	13.5	51.6	2.5	2.5	0.0	2.2	2.2	0.0	5267.2	10/2/2014	10/14/2014	12	0.5	3.562	12.47	49.12	2.2294	2.229	0	1.944	1.944	0	5258.74
9. Hydroseeding	10/3/2013	10/15/2013	12	0.5	2.4	8.6	27.3	1.1	1.1	0.0	1.0	1.0	0.0	2839.9	10/2/2014	10/14/2014	12	0.5	2.218	8.601	25.24	0.967	0.967	0	0.89	0.89	0	2840.77
10. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.4	2.5	6.3	0.3	0.3	0.0	0.3	0.3	0.0	796.1	10/20/2014	10/30/2014	10	0.5	0.331	2.337	5.75	0.2479	0.248	0	0.215	0.215	0	795.193

														Project D														
Construction Phase							2013													2	014							
Construction Phase		Schedule							PM10			PM2.5				Schedule							PM10			PM2.5		i
	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2	Start	End	Days	Мо	ROG	со	NOx	Tot	Ex	FD	Tot	Ex	FD	CO2
Clearing and Grubbing/ Stripping	5/15/2013	5/25/2013	10	0.5	6.3	29.7	85.2	63.3	3.3	60	15.4	2.9	12.48	7744.0	5/15/2014	5/25/2014	10	0.5	5.967	29.19	81.11	63.027	3.027	60	15.21	2.735	12.48	7739.48
2. Borrow Site Preparation	5/15/2013	6/14/2013	30	1.4	8.2	39.3	100.9	4.3	4.3	0	4.0	4.0	0	8466.5	5/15/2014	6/14/2014	30	1.4	7.84	39.24	95.87	4.069	4.069	0	3.742	3.742	0	8465.81
3. Levee Degrading/ Work Surface Construction	5/29/2013	6/8/2013	10	0.5	26.2	119.3	325.8	13.8	13.8	0	12.7	12.7	0	27271.0	5/29/2014	6/8/2014	10	0.5	25.1	118.8	310.3	13.074	13.07	0	11.98	11.98	0	27262.4

. Cutoff Wall Construction	6/12/2013	7/27/2013	45	2.0	9.4	52.2	99.3	5.0	5.0	0	4.6	4.6	0	10466.7	6/12/2014	7/7/2014	25	1.1	8.723	52.08	92.5	4.5256	4.526	0	4.155	4.155	0	10561
. Levee Reconstruction/ Seepage Berm Construction	7/11/2013	9/9/2013	60	2.7	25.9	110.5	300.4	13.9	13.9	0	12.8	12.8	0	23483.5	7/10/2014	9/8/2014	60	2.7	25.03	110.4	287.9	13.302	13.3	0	12.23	12.23	0	23476
. Borrow Site Excavation	7/11/2013	9/9/2013	60	2.7	4.5	22.0	102.5	5.2	3.2	2	3.0	2.6	0.416	14192.1	7/10/2014	9/8/2014	60	2.7	3.663	18.4	95.26	4.5141	2.514	2	2.342	1.926	0.416	14179
. Utility Reconstruction	6/28/2013	9/1/2013	65	3.0	0.5	2.8	5.7	0.3	0.3	0.0	0.3	0.3	0.0	599.2	6/30/2014	9/3/2014	65	3.0	0.451	2.808	5.259	0.2545	0.254	0	0.233	0.233	0	599.18
. Levee Resurfacing	10/3/2013	10/15/2013	12	0.5	3.9	13.5	51.6	2.5	2.5	0.0	2.2	2.2	0.0	5267.2	10/2/2014	10/14/2014	12	0.5	3.562	12.47	49.12	2.2294	2.229	0	1.944	1.944	0	5258.7
. Hydroseeding	10/3/2013	10/15/2013	12	0.5	2.4	8.6	27.3	1.1	1.1	0.0	1.0	1.0	0.0	2839.9	10/2/2014	10/14/2014	12	0.5	2.218	8.601	25.24	0.967	0.967	0	0.89	0.89	0	2840.7
0. Demobilization/Cleanup	10/21/2013	10/31/2013	10	0.5	0.5	2.8	8.4	0.4	0.4	0.0	0.3	0.3	0.0	1113.7	10/20/2014	10/30/2014	10	0.5	0.384	2.571	7.679	0.2945	0.295	0	0.247	0.247	0	1112

Appendix E

Greenhouse Gas Calculation Spreadsheets and Supporting Information

GREENHOUSE GAS APPENDIX CACULATION SPREADSHEETS AND SUPPORTING INFORMATION

Comparison of Project Total GHG Emissions

	GHG (Constituent	Tons		GHG, CO	2-Eq Tons	
Emission Category	CO2	CH4	N2O	CO2	CH4	N2O	CO2-EQ
		ALT	ERNATIVE 1	•			
Off-Road Equipment	15,076	3.0	0.20	15,076	63	0.20	15,139
On-Road Vehicles	9,131	0		9,131	7		9,137
Total	24,206	3.3	0.20	24,206	70	0.20	24,276
Levee Project Lifetime, yea	ars						50
Annualized GHG Emissions	s, tons CO2-	eq per year					486
		ALT	ERNATIVE 2				
Off-Road Equipment	18,930	3.8	0.25	18,930	79	0.25	19,010
On-Road Vehicles	19,022	1		19,022	12		19,034
Total	37,952	4.4	0.25	37,952	92	0.25	38,044
Levee Project Lifetime, yea	ars						50
Annualized GHG Emissions	s, tons CO2-	eq per year					761
		ALT	ERNATIVE 3	}			
Off-Road Equipment	16,788	3.4	0.22	16,788	71	0.22	16,859
On-Road Vehicles	9,547	0		9,547	7		9,554
Total	26,335	3.7	0.22	26,335	78	0.22	26,413
Levee Project Lifetime, yea	ars						50
Annualized GHG Emissions	s, tons CO2-	eq per year					528

 $\label{lem:c:locuments} C:\Documents and Settings\19485\Desktop\Transfer\Feather-River-Levees_Feb-2012\GHG Calcs\[SBFCA-GHG_imw_2-13-2012.xls]\Summary$

Default Construction Equipment Factors from Sacramento Roadway Construction Emission Model

Equipment	d Factor Default V	alues		g/hp-hr	Vehicle	
	HP	Load Factor	Hrs/Day]	CO2	CH4
Bore/Drill Rigs	291	0.75	8	427	N/A	N/A
Cement and Mortar Mixers	10	0.56	8	319	N/A	N/A
Cranes	399	0.43	8	245	N/A	N/A
Excavators	168	0.57	8	324	N/A	N/A
Generator Sets	549	0.74	8	421	N/A	N/A
Graders	174	0.61	8	347	N/A	N/A
Off-Highway Tractors	267	0.65	8	370	N/A	N/A
Off-Highway Trucks	479	0.57	8	324	N/A	N/A
Rollers	95	0.56	8	319	N/A	N/A
Rough Terrain Forklifts	93	0.60	8	336	N/A	N/A
Rubber Tired Dozers	357	0.59	8	336	N/A	N/A
Rubber Tired Loaders	157	0.54	8	307	N/A	N/A
Scrapers	313	0.72	8	410	N/A	N/A
Water Trucks	120	0.75	8	324	N/A	N/A
Commute Vehicles	N/A	N/A	N/A	N/A	426.7	0.018
Heavy Duty Trucks	N/A	N/A	N/A	N/A	1880	0.038

Alternative 1: Off-Road Equipment GHG Emissions and Annual Fuel Usage

				Proje	ect A							- 1	rojec	t B								Proje	ct C									Proje	ct D								Project-W	ide Fuel Usage		
Equipment	1	_	4 . No.	5	6 No.	7 No. 1	8 9	10 No.	1	2	3	4 No.	5	6 No. 1	7 8	3 9 o. No	10 b. No	1	2 No.	3	4	5	6		8	9 1 No. N	0 1	. 2	2 3	4 A	1 5	6	7	8	9 . No.	1	0 Days		Project Pieces*Days		CO2 EF	Project CO2	BSFC hp-hr/gal	Project Gallons
Aerial Lifts	140.	10. NO	140.	140.	140.	140.	10. 110	. 140.	140.	140.	140.	140.	140.	140.	10. 11	O. 140). IVO	. 140.	NO.	NO.	140.	NO.	140.	140.	140.	140. 14	0. 140). I'vi	0. 140). IVC	J. 140). INO	. 140.	. 140.	. 140.	NO.	20		nicces buys	111-111	g/iip-iii	Tollaryi	20	Odilon
Air Compressors		,	,																																		20		,	0			20	0
Bore/Drill Rigs		1	1 1	П	- 1		1	1				1	- 1	-1	1	Т	1	+	1	1	2			\neg			+	-	Т	1	2	1	1	1	T		20		380	663,919	426.6	312	20	33,196
Cement and Mortar Mixers		-	2		-			1				2	-				+	+	1		4			\dashv			_	+		_	3	+	+	+			20		685		318.5	11	20	1,584
Cranes		+	╁▔			2		1							2	_		T					t	\rightarrow			+	+	_		Ť						20		460	631,535	244.6	170	20	31,577
Excavators			3 5		2	2					3	4		2	2			1		3	8			1				\top		3	6			1			20		2,970	2,276,378	324.2	813	20	113,819
Generator Sets			4									4									6			_				T			5						20		1,175	3,820,263	420.9	1,771	20	191,013
Graders				2			2						2			2						2		_	2			T				5			2		20		1,170	991,817	346.9	379	20	49,591
Off-Highway Tractors		2								2									2			5						1	4			5					20		1,620	2,249,067	369.7	916	20	112,453
Off-Highway Trucks			7 3									3								7	3				2					7	3		:	1 :	2		20		1,661	3,627,557	324.2	1,295	20	181,378
Other Construction Equipment			1																																		20		60	22,228	352.7	9	20	1,111
Rollers			5	5			2				5		5			2				5		4			2					5		5			2		20		2,750	1,175,307	318.5	412	20	58,765
Rough Terrain Forklifts								1				1						1			1						1				1					1	20		258	115,676	335.6	43	20	5,784
Rubber Tired Dozers									2																												20		80	134,825	335.6	50	20	6,741
Rubber Tired Loaders	4	0	2		2	2						2		2	2			2	2		4		2					2			3		3				20		2,195	1,488,723	307.1	504	20	74,436
Scrapers	8	2 1	5	20					8	2	15		20					4	1 2	14		10	0					3	4 1	4	1	0					20	-	8,920	16,056,152	409.5	7,241	20	802,808
Water Trucks	2	1	3 2	3	2	2	1 2	2	2	1	3	2	3	2	2	1	2	2	1	4	2	3	2	1	1	2		2	2	3	2	3	3	1	1 2		20		4,477	3,223,440	324.2	1,151	20	161,172
Construction Days	20	20 40	60	60	60	100	22 18	18	40	60	80	50	80	80 1	.30	20 2	0 1	5 40	60	35	60	130	130	130	24	24	20 4	10 6	50 2	25 7	75 9	0 9	0 13	0 24	4 24	20						15,076		1,825,428

Activity Codes:

- 1 Clearing/Grubbing
- 2 Borrow Site Preparation
- 3 Levee Degrading
- 4 Cutoff Wall Construction
- _ . _
- 6 Borrow Site Excavation and Hauling
- 7 Utility Reconstruction
- 8 Levee Resurfacing
- 9 Hydorseeding
- 10 Demobilization/Cleanu

 $C: No cuments and Settings \ 19485 \setminus Desktop \ Transfer \setminus Feather-River-Levees_Feb-2012 \setminus GHG\ Calcs \setminus SBFCA-GHG_jmw_2-13-2012.xls] Alt2-GHG\ Calcs \setminus SBFCA-GHG_jmw_2-13-2012.xls] Alt3-GHG\ Calcs \setminus SBFCA-GHG_jmw_$

ALTERNATIVE 1: ON-ROAD VEHICLE EMISSIONS

Trip Type		Proj	ject A			Project	В			Proje	ct C			Proje	ct D			Combin	ed Projec	ts	
Workers	79				76				102				102								
Duration, Days	418				575				653				578								
Round Trip Dist., miles	60				60				60				60								
Worker Vehicle Miles	1,986,336				2,618,550				4,008,114				3,547,764								
								Round				Round				Round					
		Truck		Round Trip				Trip		Truck		Trip		Truck		Trip		CO2 EF,		CH4 EF,	CH4
Vehicle Type	Total CY	Load	Trips	Miles	Total CY	Truck Load	Trips	Miles	Total CY	Load	Trips	Miles	Total CY	Load	Trips	Miles	VMT	g/mi	CO2 Tons	g/mi	Tons
Worker Commute																	12,160,764	426.7	5,715	0.018	0.241
Unsuitable Soil Disposal, cy	31500	12	2625	3	520,250	12	43,354	3	253,000	12	21,083	3	14,000	12	1,167	3	204,688	1880	424	0.038	0.009
Bentonite			89	26			119	16			191	12			197	36	13,602	1880	28	0.038	0.001
Aggregate Surfacing			425	36			400	26			1,500	20			1,500	28	97,700	1880	202	0.038	0.004
Pipe Material			8	36			17	16			31	12			44	28	2,164	1880	4	0.038	0.000
Demolition Debris			60	36			36	16			160	12			275	28	12,356	1880	26	0.038	0.001
CLSM Backfill		,	26	36			36	16			104	12			76	28	4,888	1880	10	0.038	0.000
Borrow Fill, cy	244,000	12	20,333	6	796,750	12	66,396	6	531,000	12	44,250	8	330,000	12	27,500	16	1,314,375	1880	2,721	0.038	0.055
TOTALS					•														9,131		0.310

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Alternative 2 Off-Road Equipment GHG Emissions and Fuel Usage

				Proj	ect A								Pı	roject E	,								Projec	t C								Pro	oject	D					Combined Proj	ects GHG I	missions and F	uel Usage	
	1	2	3 4	5	6	7	8	9 1	.0	1	2	3	4	5	6	7	8 9	10	1	2	3	4	5	6	7	8	9 10) :	1 2	2	3	4	5	6	7	8	9 10	Projec	t Project	CO2 EF	Project CO2	Avg BSFC	Project
Equipment	No.	No. N	o. No	No.	No.	No.	No.	No. N	lo.	No.	No.	No.	No.	No.	lo. N	10. N	lo. No.	No.	No.	. No	. No	No.	No.	No.	No. 1	No. I	No. No). N	No. N	o. I	No. N	lo. N	lo.	No.	No.	No.	No. No.	No*Day	S HP-hr	g/hp-hr	Tons/yr	hp-hr/gal	Gallons
Bore/Drill Rigs				1																		1										0						35	61,150	426.6	29	20	3,058
Cement and Mortar Mixers				1									2									2										0						160	7,398	318.5	3	20	370
Cranes						2										2																						490	672,722	244.6	181	20	33,636
Excavators			1	2 2	2 4	1 2						1	4		2	2						3 4			1						0	0			1			2,49	1,910,012	324.2	682	20	95,501
Generator Sets				2									2									3										0						195	634,001	420.9	294	20	31,700
Graders					5		1							5			2	2					2			4							5			2		3,179	2,694,860	346.9	1,030	20	134,743
Off-Highway Tractors		4									4										4		5							4			2					2,03	3 2,829,382	369.7	1,152	20	141,469
Off-Highway Trucks			7	2								6	2					1				7 2			1	2					0	0			1	2		888	1,939,356	324.2	692	20	96,968
Other Construction Equipment				1																																		10	3,705	352.7	1	20	185
Rollers			2		5		1					2		5			3	1				5	5			4					0		5			2		3,90	1,668,081	318.5	585	20	83,404
Rough Terrain Forklifts									1				1						1			1						1				0						1 14	65,909	335.6	24	20	3,295
Rubber Tired Dozers										4																												160	269,650	335.6	100	20	13,483
Rubber Tired Loaders	4	0		1		1 2							1		4	2				7		2		4					3			0		2				3,510	2,380,600	307.1	805	20	119,030
Scrapers	8	4	2	25	5					8	4	2		25						13	4 1	4	10	0					5	4	0		10					14,24	7 25,644,843	409.5	11,566	20	1,282,242
Water Trucks	2	2	2	1 4	1 4	1 2	1	2		2	2	1	1	4	4	2	1	1 2	2	7	2	4 1	3	4	1	2	2		3	2	0	0	3	2	1	1	2	6,949	5,003,280	324.2	1,786	20	250,164
Construction Days	40	22	10 1	.0 180	170	115	5	20	22	40	50	22	50	145	145	130	40 2	0 15	5 .	40 6	0 2	0 25	180	180	130	24	24 2	20	40	60	0	0 1	185	185	130	24	24 1	5			18,930		2,289,247

Activity Codes:

1 - Clearing/Grubbing

2 - Borrow Site Preparation

3 - Levee Degrading

4 - Cutoff Wall Construction

5 - Levee Reconstruction 6 - Borrow Site Excavation and Hauling

7 - Utility Reconstruction 8 - Levee Resurfacing

9 - Hydorseeding

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ALTERNATIVE 2: ON-ROAD VEHICLE EMISSIONS

Trip Type			Project A				F	roject B					Project C					Project D)			Co	mbined Pro	jects	
Workers	132					129					135					102									
Duration, Days	594					657					693					663									
Round Trip Dist., miles	60					60					60					60									
Worker Vehicle Miles	4,704,480					5,073,354					5,625,774					4,069,494									
		Truck		Round	Vehicle				Round			Truck		Round Trip			Truck		Round Trip			2014 CO2			
Vehicle Type	Total CY	Load	Trips	Trip Miles	Miles	Total CY	Truck Load	Trips	Trip Miles	Vehicle Miles	Total CY	Load	Trips	Miles	Vehicle Miles	Total CY	Load	Trips	Miles	Vehicle Miles	VMT	EF, g/mi	CO2 Tons	CH4 EF, g/mi	ii CH4 Ton
Worker Commute					4704480					5,073,354					5,625,774					4,069,494	19,473,102	426.7	9,151	0.018	0.38
Unsuitable Soil Disposal, cy	75	12	6.25	3	19	22,000	12	1,833	3	5,500	322,900	12	26,908	3	80,725	29,000	12	2,417	3	7,250	93,494	1880	194	0.038	0.00
Bentonite			1	26	26			31	16	496			28	12	336			197	36	7,092	7,950	1880	16	0.038	0.00
Aggregate Surfacing			50	18	900			225	26	5,850			1,200	20	24,000			1,500	28	42,000	72,750	1880	151	0.038	0.00
Pipe Material			8	36	288			17	16	272			31	12	372			44	36	1,584	2,516	1880	5	0.038	0.00
Demolition Debris			60	36	2,160			36	16	576			160	12	1,920			275	36	9,900	14,556	1880	30	0.038	0.00
CLSM Backfill			26	36	936			36	16	576			104	12	1,248			76	36	2,736	5,496	1880	11	0.038	0.00
Borrow Fill, cy	1,628,000	12	135,667	6	814,000	2,334,500	12	194,542	6	1,167,250	2,681,200	12	223,433	8	1,787,467	601,500	12	50,125	16	802,000	4,570,717	1880	9,464	0.038	0.19
TOTALS																							19,022		0.58

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Off-Road Equipment GHG Emissions: Alternative 3

				F	rojec	t A							Pro	ject	В							Pi	oject	С								Proje	ect D						Pro	oject-Wide GHG	Emissions		
	1	2	3	4	5 (6 7	7 8	3 9	10	1	2	3 .	1 5	6	7	8	9	10	1	2	3 4	4 5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	Equipment	Project	Equip CO2 EF	Project CO2	Avg BSFC	Project
Equipment	No.	No.	No.	No.	No. N	lo. N	o. N	o. No	. No.	No.	No.	No. N	o. No	. No	. No.	No.	No.	No.	No.	lo. 1	No. N	o. No	No.	No.	No.	No.	No.	No.	No.	No	. No.	No.	No.	No.	No.	No.	No.	Pieces*Days	HP-hr	g/hp-hr	Tons/yr	hp-hr/gal	Gallons
Bore/Drill Rigs				1									2									2									- 2	2						490	856,106	426.6	402	20	42,805
Cement and Mortar Mixers				2									2									4									3	3						745	34,449	318.5	12	20	1,722
Cranes							2								2																							520	713,909	244.6	192	20	35,695
Excavators			3	2		2	2					3	4		2 2						3	8		1	L						3 6	5		1				3,055	2,341,527	324.2	836	20	117,076
Generator Sets				4									4									6										5						1,295	4,210,417	420.9	1,952	20	210,521
Graders					2			2						2		2							2		2							-,	5		2			1,188	1,007,076	346.9	385	20	50,354
Off-Highway Tractors		2									2									2		-	5						4	ı		-,	5					1,700	2,360,132	369.7	961	20	118,007
Off-Highway Trucks			7	3									3			2					7	3		1	. 2						7 3	3		1	. 2			2,345	5,121,385	324.2	1,829	20	256,069
Rollers			5		5			2				5		5		2					5		5		2						5	-,	5		2			3,038	1,298,394	318.5	455	20	64,920
Rough Terrain Forklifts				1					1				1					1				1					1				1	1					1	357	160,064	335.6	59	20	8,003
Rubber Tired Dozers										4																												160	269,650	335.6	100	20	13,483
Rubber Tired Loaders	4	0		2		2	2						2		2 2				2			4	- 2	2				2	2		13	3	(1)	3				2,405	1,631,152	307.1	552	20	81,558
Scrapers	8	2	15		20					8	2	15	2	0					4	2	14	1) ()				3	4	1	4	10	0					9,635	17,343,164	409.5	7,822	20	867,158
Water Trucks	2	1	3	2	3	2	2	1	2	2	1	3	2	3	2 2	1	2		2	1	4	2	3 2	2 1	1	2		2	2	2	3 2	2	3 3	3 1	. 1	2		4,793	3,450,960	324.2	1,232	20	172,548
Construction Period, Days	40	60	100	60	60	50 13	0 2	4 2	4 24	40	60	45	30 8	5 9	5 130	22	20	18	40	60	35 6	50 13	130	130	24	24	20	40	60) 2	5 75	5 90	0 90	130	24	24	20	Pro	ject Total Emis	ssions	16,788		2,039,919

Activity Codes:

1 - Clearing/Grubbing

2 - Borrow Site Preparation

3 - Levee Degrading

4 - Cutoff Wall Construction

5 - Levee Reconstruction

6 - Borrow Site Excavation and Hauling

7 - Utility Reconstruction

8 - Levee Resurfacing 9 - Hydorseeding

10 - Demobilization/Cleanup

 $C: \label{lem:c:decomp} C: \$

ON-ROAD VEHICLE EMISSIONS, ALTERNATIVE 3

Trip Type			Project .	A				Project E	3				Project	С				Project	D			Comb	ined Pro	ject	
Workers	79.2					75.9					102.3					102.3									
Duration, Days	572					595					653					578									
Round Trip Dist., miles	60					60					60					60									
Worker Vehicle Miles	2,718,144					2,709,630					4,008,114					3,547,764									
Vehicle Type	Total CY	Truck Load	Trips	Round Trip Miles	Vehicle Miles	Total CY	Truck Load	Trips	Round Trip Miles	Vehicle Miles	Total CY	Truck Load	Trips	Round Trip Miles	Vehicle Miles	Total CY	Truck Load	Trips	Round Trip Miles	Vehicle Miles	VMT	2014 CO2 EF, g/mi		CH4 EF,	CH4 Tons
Worker Commute					2,718,144					2,709,630					4,008,114					3,547,764	12,983,652	426.7	6,101	0.018	0.26
Unsuitable Soil Disposal, cy	25,750	12	2,146	3	6,438	520,250	12	43,354	3	130,063	253,100	12	21,092	3	63,275	14,000	12	1,167	3	3,500	203,275	1880	421	0.038	0.009
Bentonite			78	26	2,028			119	16	1,904			193	12	2,316			197	36	7,092	13,340	1880	28	0.038	0.001
Aggregate Surfacing			350	36	12,600			400	26	10,400			1,500	20	30,000			1,500	28	42,000	95,000	1880	197	0.038	0.004
Pipe Material			8	26	208			17	16	272			31	12	372			44	36	1,584	2,436	1880	5	0.038	0.000
Demolition Debris			60	26	1,560			36	16	576			160	12	1,920			275	36	9,900	13,956	1880	29	0.038	0.001
CLSM Backfill			26	26	676			36	16	576			104	12	1,248			76	36	2,736	5,236	1880	11	0.038	0.000
Borrow Fill, cy	276,250	12	23,021	6	138,125	796,750	12	66,396	6	398,375	531,300	12	44,275	8	354,200	330,100	12	27,508	16	440,133	1,330,833	1880	2,755	0.038	0.056
TOTALS		•	•	•	•			•	•	•			•			•			•	•			9,547		0.33

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Appendix F Additional Resource Information for the Biological Study Area

United States Department of the Interior



FISH AND WILDLIFE SERVICE



Sacramento Fish and Wildlife Office 2800 Cottage Way, Room W-2605 Sacramento, California 95825

February 10, 2012

Document Number: 120210051632

Jennifer Haire ICF International 630 K Street, Suite 400 Sacramento, CA 95814

Subject: Species List for Feather River West Levee Project

Dear: Ms. Haire

We are sending this official species list in response to your February 10, 2012 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be May 10, 2012.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found <u>here</u>.

Endangered Species Division

These buttons will not appear on your list.

Revise Selection

Print this page

Print species list before going on to letter.

Make Official Letter

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 120210051632

Database Last Updated: September 18, 2011

Quad Lists

Listed Species

Invertebrates

- Branchinecta conservatio
 - o Conservancy fairy shrimp (E)
- Branchinecta lynchi
 - o vernal pool fairy shrimp (T)
- Desmocerus californicus dimorphus
 - o valley elderberry longhorn beetle (T)
- Lepidurus packardi
 - o vernal pool tadpole shrimp (E)

Fish

- Acipenser medirostris
 - o green sturgeon (T) (NMFS)
- Hypomesus transpacificus
 - o delta smelt (T)
- Oncorhynchus mykiss
 - o Central Valley steelhead (T) (NMFS)

- o Critical habitat, Central Valley steelhead (X) (NMFS)
- Oncorhynchus tshawytscha
 - o Central Valley spring-run chinook salmon (T) (NMFS)
 - o Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
 - o winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Ambystoma californiense
 - o California tiger salamander, central population (T)
- Rana draytonii
 - o California red-legged frog (T)

Reptiles

- Thamnophis gigas
 - o giant garter snake (T)

Plants

- Orcuttia tenuis
 - o slender Orcutt grass (T)
- Tuctoria greenei
 - o Greene's tuctoria (=Orcutt grass) (E)

Candidate Species

Birds

- Coccyzus americanus occidentalis
 - o Western yellow-billed cuckoo (C)

Quads Containing Listed, Proposed or Candidate Species:

NICOLAUS (529A)

YUBA CITY (544A)

SUTTER (544B)

OLIVEHURST (544D)

PALERMO (560A)

BIGGS (560B)

GRIDLEY (560C)

County Lists

No county species lists requested.

Key:

- (E) Endangered Listed as being in danger of extinction.
- (T) Threatened Listed as likely to become endangered within the foreseeable future.
- (P) Proposed Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the <u>National Oceanic & Atmospheric Administration</u> <u>Fisheries Service</u>. Consult with them directly about these species.
- Critical Habitat Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online <u>Inventory of Rare and Endangered Plants</u>.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

See our <u>Protocol</u> and <u>Recovery Permits</u> pages.

For plant surveys, we recommend using the <u>Guidelines for Conducting and Reporting Botanical</u> <u>Inventories</u>. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal <u>consultation</u> with the Service.
- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information

for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be May 10, 2012.

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	Astragalus tener var. ferrisiae Ferris' milk-vetch	PDFAB0F8R3			G1T1	S1	1B.1
2	Delphinium recurvatum recurved larkspur	PDRAN0B1J0			G3	S 3	1B.2
3	Great Valley Cottonwood Riparian Forest	CTT61410CA			G2	S2.1	
4	Great Valley Mixed Riparian Forest	CTT61420CA			G2	S2.2	
5	Juncus leiospermus var. ahartii Ahart's dwarf rush	PMJUN011L1			G2T1	S1.2	1B.2
6	Monardella douglasii ssp. venosa veiny monardella	PDLAM18082			G5T1	S1.1	1B.1
7	Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1			G4T2	S2	1B.1
8	Northern Hardpan Vernal Pool	CTT44110CA			G3	S3.1	
9	Orcuttia tenuis slender Orcutt grass	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
10	Pseudobahia bahiifolia Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	G2	S2	1B.1
11	Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0			G3	S3	1B.2
12	Tuctoria greenei Greene's tuctoria	PMPOA6N010	Endangered	Rare	G1	S1	1B.1

Feather River West Levee Project - animals

Quads searched: Nicolaus, Yuba City, Sutter, Olivehurst, Biggs, Gridley, and Palermo

	Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	Antioch Dunes anthicid beetle Anthicus antiochensis	IICOL49020			G1	S1	
2	California black rail Laterallus jamaicensis coturniculus	ABNME03041		Threatened	G4T1	S1	
3	California linderiella Linderiella occidentalis	ICBRA06010			G3	S2S3	
4	Sacramento Valley tiger beetle Cicindela hirticollis abrupta	IICOL02106			G5TH	SH	
5	Sacramento anthicid beetle Anthicus sacramento	IICOL49010			G1	S1	
6	Sacramento splittail Pogonichthys macrolepidotus	AFCJB34020			G2	S2	SC
7	Swainson's hawk Buteo swainsoni	ABNKC19070		Threatened	G5	S2	
8	bald eagle Haliaeetus leucocephalus	ABNKC10010	Delisted	Endangered	G5	S2	
9	bank swallow <i>Riparia riparia</i>	ABPAU08010		Threatened	G5	S2S3	
10	burrowing owl Athene cunicularia	ABNSB10010			G4	S2	SC
11	chinook salmon - Central Valley spring-run ESU Oncorhynchus tshawytscha	AFCHA0205A	Threatened	Threatened	G5	S1	
12	giant garter snake Thamnophis gigas	ARADB36150	Threatened	Threatened	G2G3	S2S3	
13	greater sandhill crane Grus canadensis tabida	ABNMK01014		Threatened	G5T4	S2	
14	northern harrier Circus cyaneus	ABNKC11010			G5	S3	SC
15	silver-haired bat <i>Lasionycteris noctivagans</i>	AMACC02010			G5	S3S4	
16	tricolored blackbird Agelaius tricolor	ABPBXB0020			G2G3	S2	SC
17	valley elderberry longhorn beetle Desmocerus californicus dimorphus	IICOL48011	Threatened		G3T2	S2	
18	vernal pool fairy shrimp Branchinecta lynchi	ICBRA03030	Threatened		G3	S2S3	
19	vernal pool tadpole shrimp <i>Lepidurus packardi</i>	ICBRA10010	Endangered		G3	S2S3	
20	western mastiff bat Eumops perotis californicus	AMACD02011			G5T4	\$3?	SC
21	western pond turtle Emys marmorata	ARAAD02030			G3G4	S 3	SC
22	western spadefoot Spea hammondii	AAABF02020			G3	S 3	SC
23	western yellow-billed cuckoo Coccyzus americanus occidentalis	ABNRB02022	Candidate	Endangered	G5T3Q	S1	



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Basic Tools:

- All CNPS-listed plants
- Checkbox and Preset search
- Getting Started guide

Tech Tools:

- Query Builder
- Query by list of names
- Nine-quad search

Database indexes

- CNPS List
- State Status
- Federal Status
- Family
- County
- Life Form
- Topo Quad
- Common Name

Members and Friends:

- Request assistance
- Submit survey data
- Show your Plant Press

other things:

- Documentation and Resources
- Looking for common plants?
- Home of CNPS

Quick Search Form: Search • more

8th EDITION interface now available online!.....

Same data, but now includes GIS and many improvements. Not all 7th Edition features have been added yet - you can continue to use them here. To simplify access to the new features, such as GIS, each record in the 7th Edition now has a link to the corresponding details page in the 8th Edition.

INTRODUCTION to the 7th EDITION

The CNPS Inventory of Rare and Endangered Plants is now published on-line and updated quarterly. Along with the latest Inventory data from CNPS, you will find a variety of search tools, maps, thumbnail illustrations, and links to additional information.



CalPhotos archive
What rare plant is this?
(Click on image.)

The statewide CNPS website has extensive • background information about the Inventory. Since the publication of the last hardcopy 6th Edition in 2001, the review process and revisions have been ongoing. Stay informed and get involved!

Users of the Inventory may find it helpful to read the • FAQ. example: "Which search method should I use?" (answer)
New users might want to consult the • Getting Started guide.

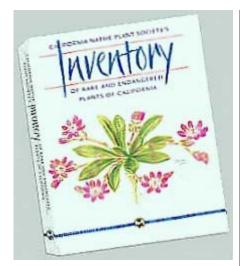
The last hardcopy edition was August 2001, but much of the front matter remains useful and informative:

Rarity in Vascular Plants - Peggy L. Fiedler Rare Bryophytes in California - James R. Shevock Bibliography for Biology and Conservation of Rare Plants - Peggy L. Fiedler and James P. Smith, Jr. Conserving Plants with Laws and Programs under the California Department of Fish and Game - Sandra Morey and Diane Ikeda

The California Natural Diversity Database- Roxanne L. Bittman

The Natural Communities Program - Todd Keeler-Wolf

The Federal
Endangered
Species Act
and Rare Plant
Protection in
California - Jim
A. Bartel, Jan C.
Knight, and Diane
Elam
Sensitive Plant
Management
on the National
Forests and
Grasslands in
California Bradley E. Howell
Rare Plant
Conservation



on Bureau of Land Management Lands - John Willoughby History of the CNPS Rare Plant Program





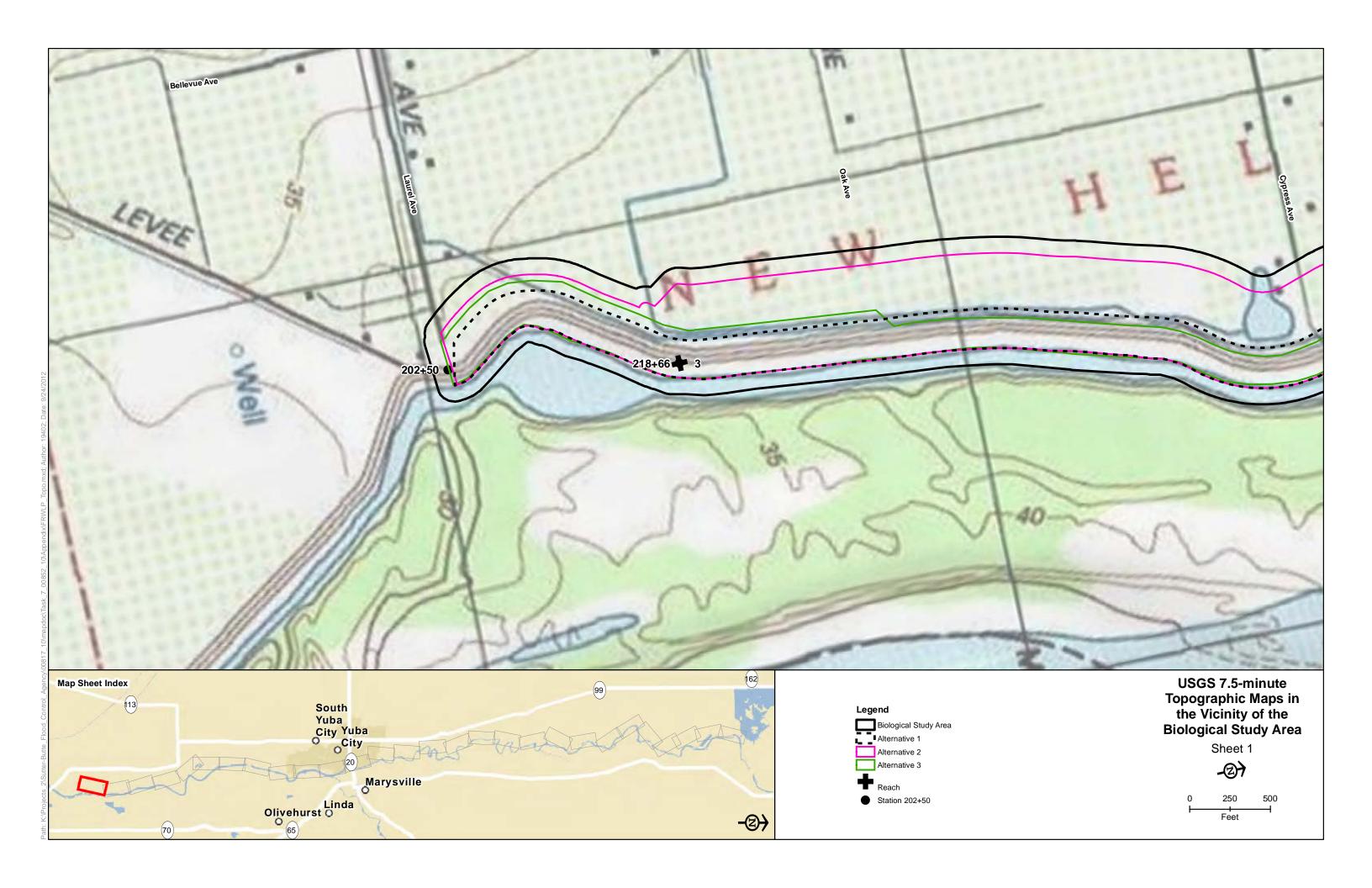
CNPS Inventory of Rare and Endangered Plants

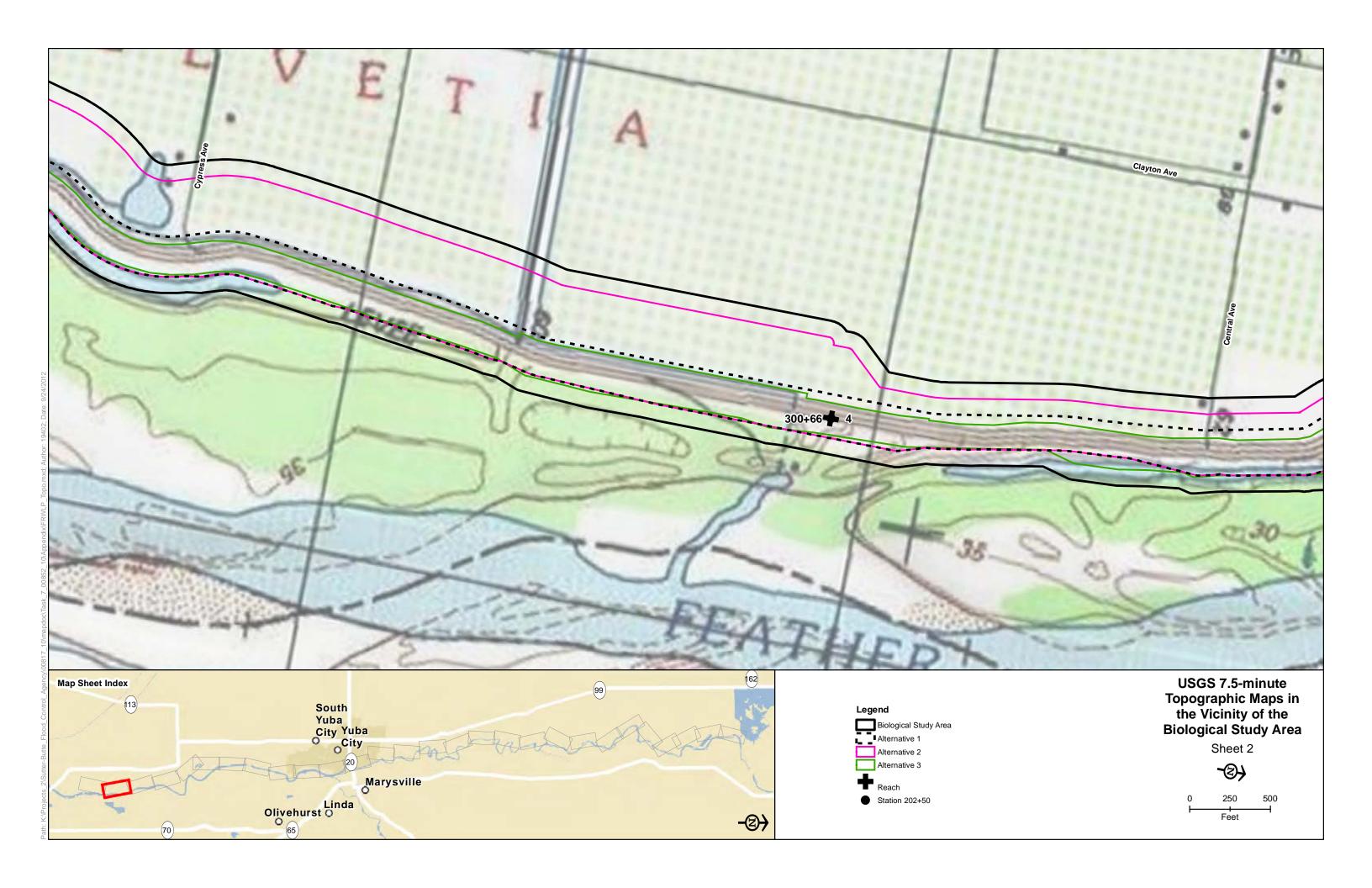
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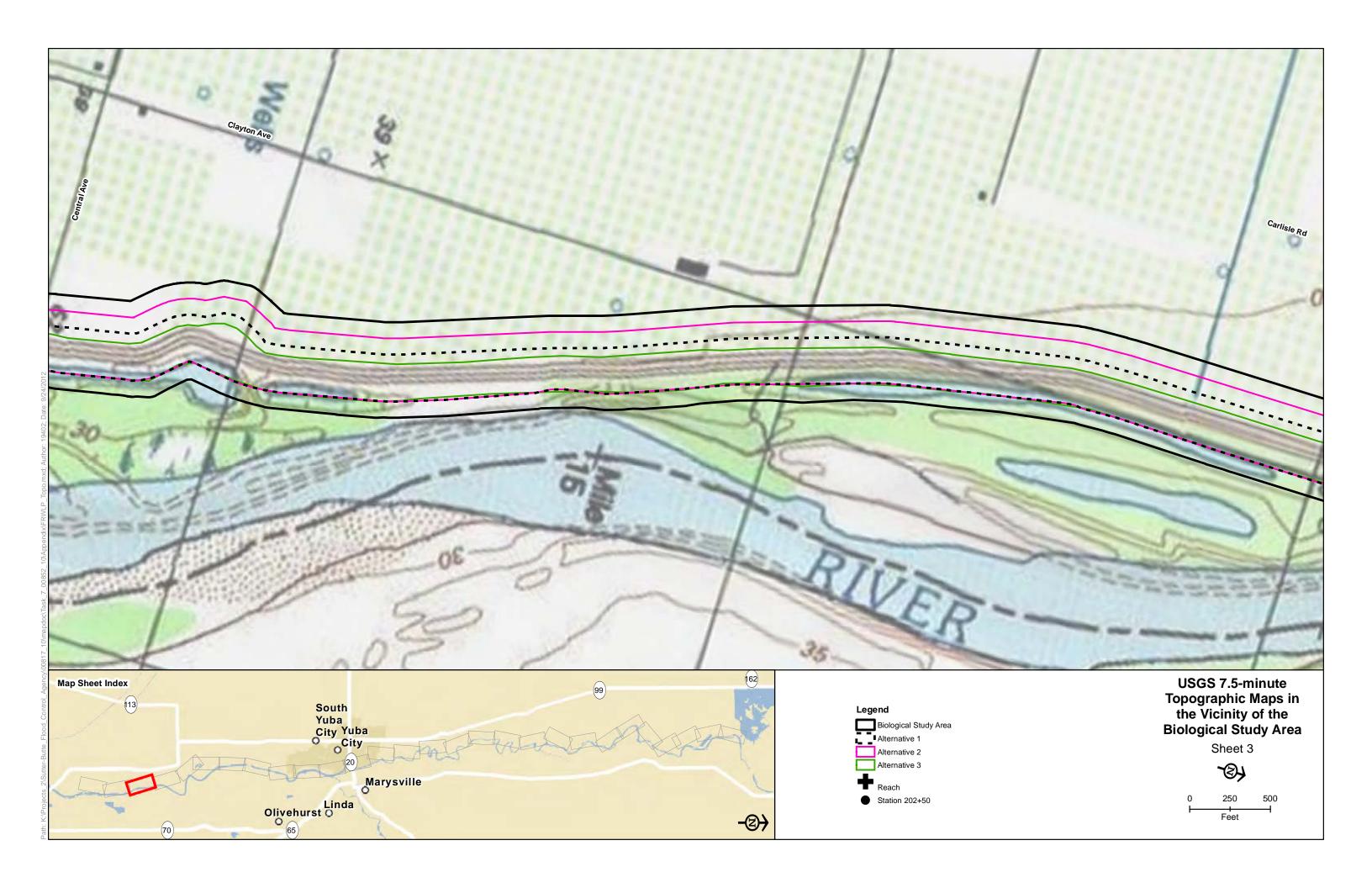
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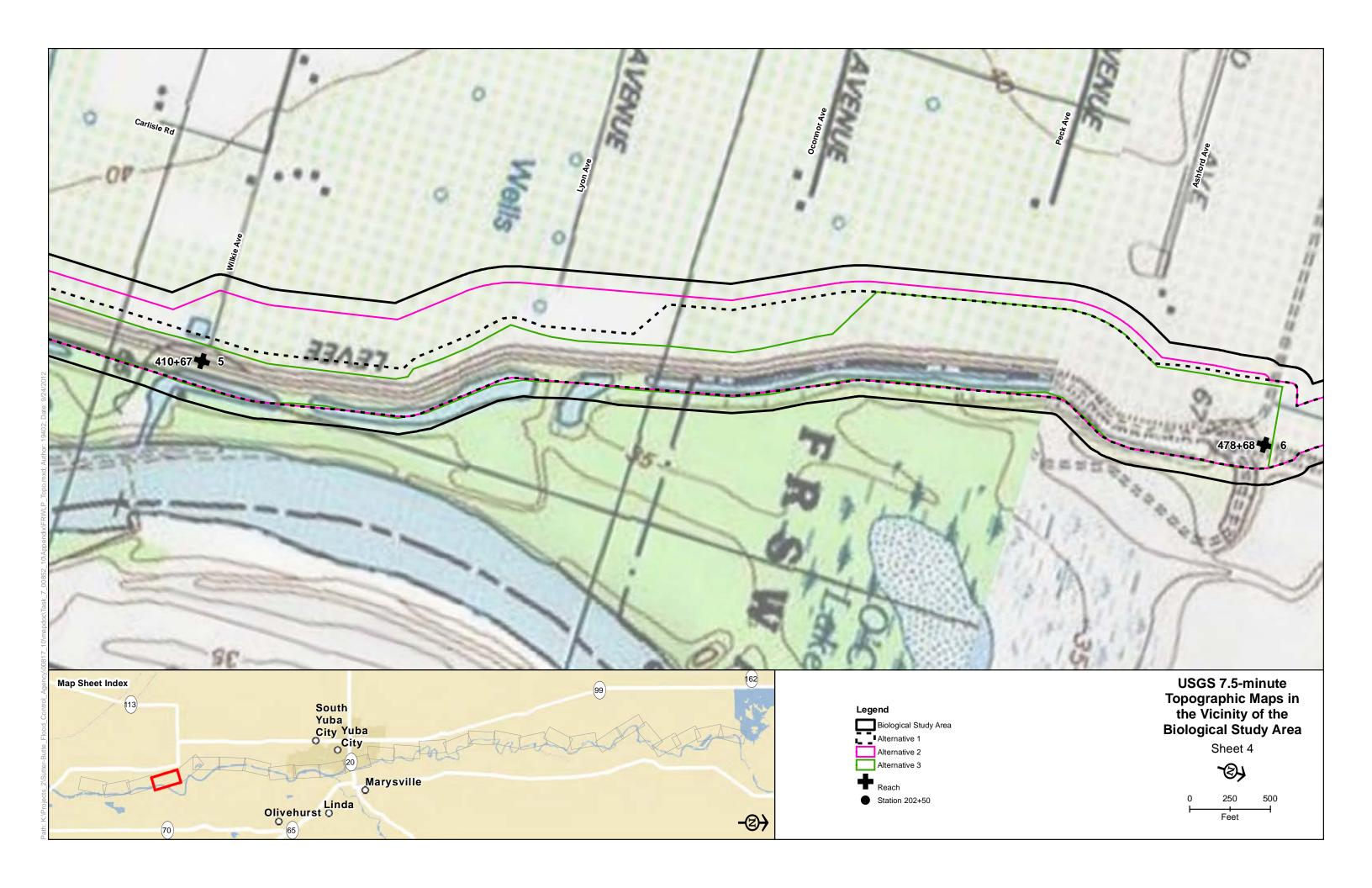
ECOLOGICAL REPORT

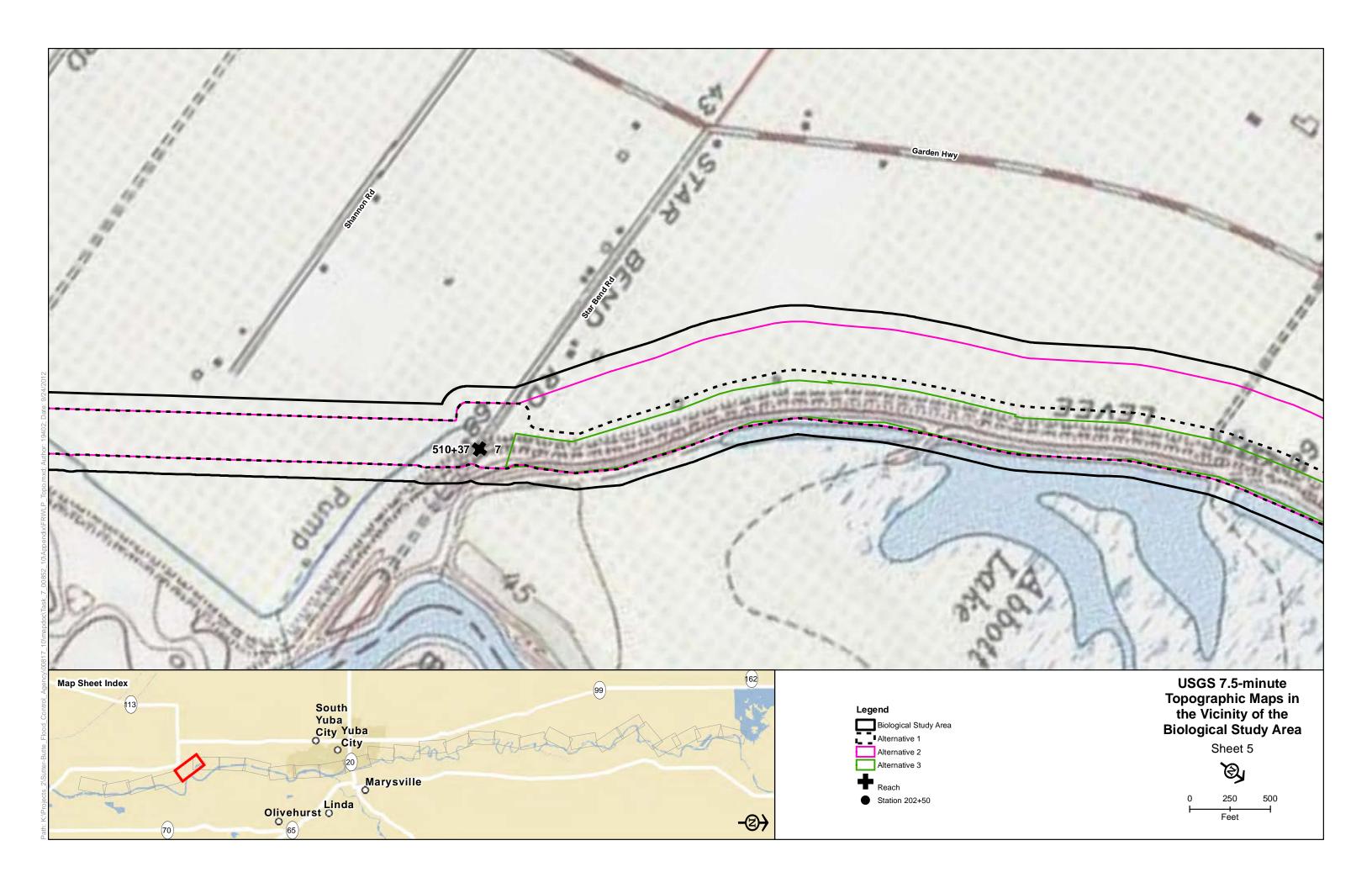
scientific	family	life form	blooming	communities	elevation	CNPS
<u>Astragalus tener</u> var. <u>ferrisiae</u>	Fabaceae	annual herb	Apr-May	 Meadows and seeps (Medws)(vernally mesic) Valley and foothill grassland (VFGrs)(subalkaline flats) 	2 - 75 meters	List 1B.1
<u>Delphinium</u> <u>recurvatum</u>	Ranunculaceae	perennial herb	Mar-Jun	 Chenopod scrub (ChScr) Cismontane woodland (CmWld) Valley and foothill grassland (VFGrs)/alkaline 	3 - 750 meters	List 1B.2
<u>Juncus</u> <u>leiospermus</u> var. <u>ahartii</u>	Juncaceae	annual herb	Mar-May	•Valley and foothill grassland (VFGrs)(mesic)	30 - 229 meters	List 1B.2
Monardella douglasii ssp. venosa	Lamiaceae	annual herb	May-Jul	Cismontane woodland (CmWld) Valley and foothill grassland (VFGrs)/heavy clay	60 - 410 meters	List 1B.1
Orcuttia tenuis	Poaceae	annual herb	May-Sep(Oct), Months in parentheses are uncommon.	•Vernal pools (VnPls)	35 - 1760 meters	List 1B.1
<u>Pseudobahia</u> <u>bahiifolia</u>	Asteraceae	annual herb	Mar-Apr	Cismontane woodland (CmWld)Valley and foothill grassland (VFGrs)/clay, often acidic	15 - 150 meters	List 1B.1
<u>Sagittaria</u> <u>sanfordii</u>	Alismataceae	perennial rhizomatous herb emergent	May-Oct	 Marshes and swamps (MshSw)(assorted shallow freshwater) 	0 - 650 meters	List 1B.2
Tuctoria greenei	Poaceae	annual herb	May-Jul(Sep), Months in parentheses are uncommon.	•Vernal pools (VnPls)	30 - 1070 meters	List 1B.1

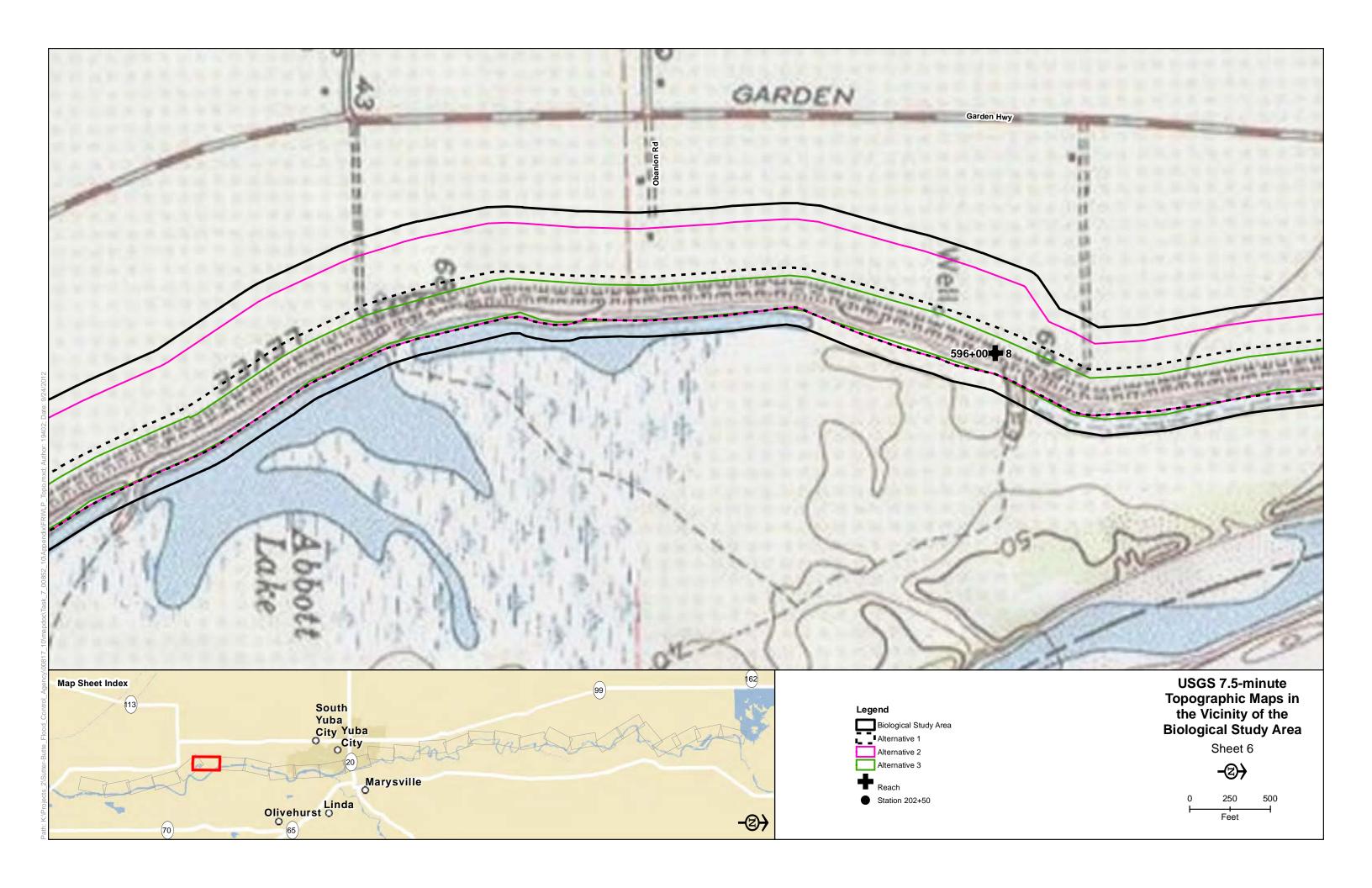


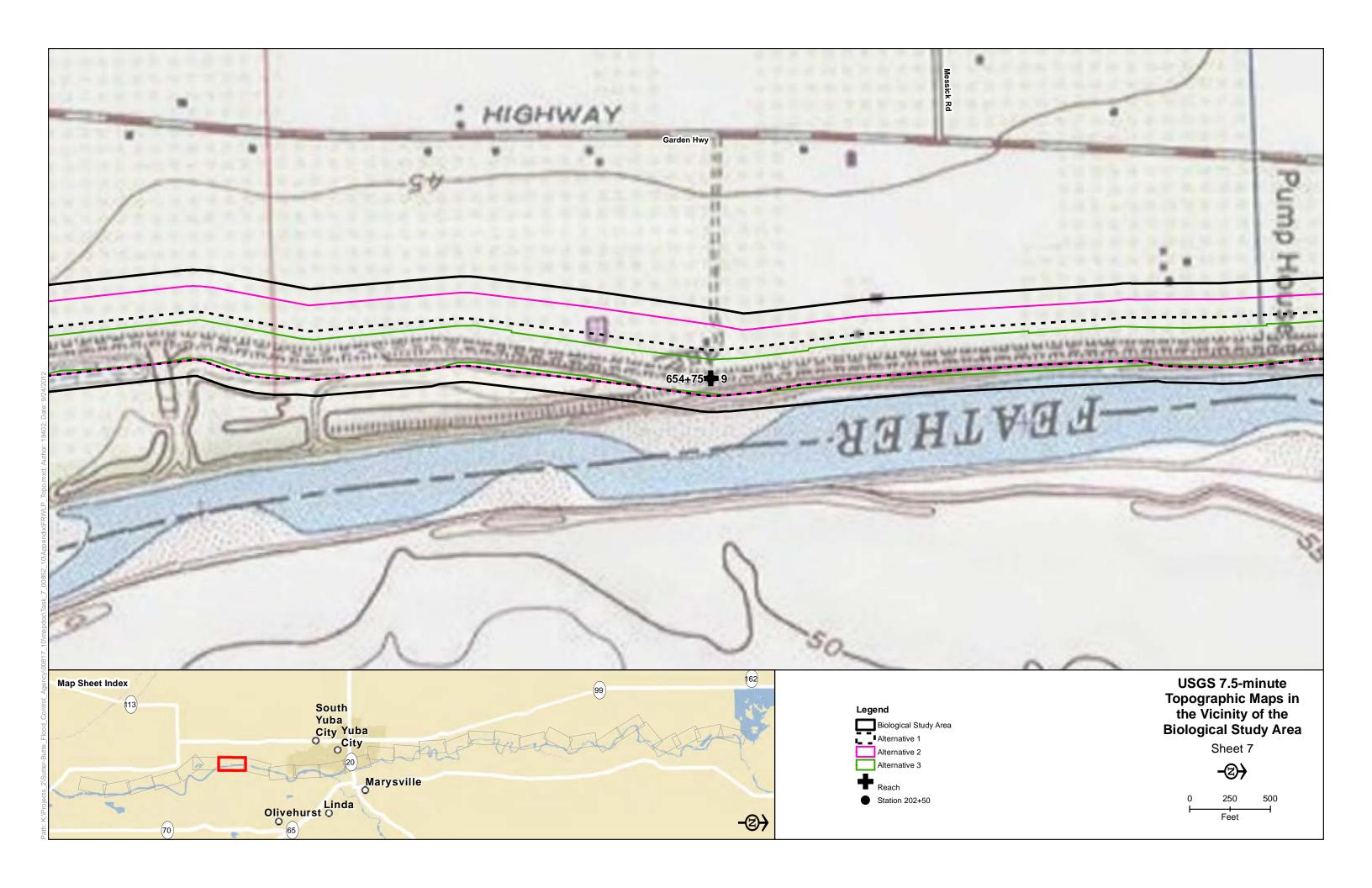


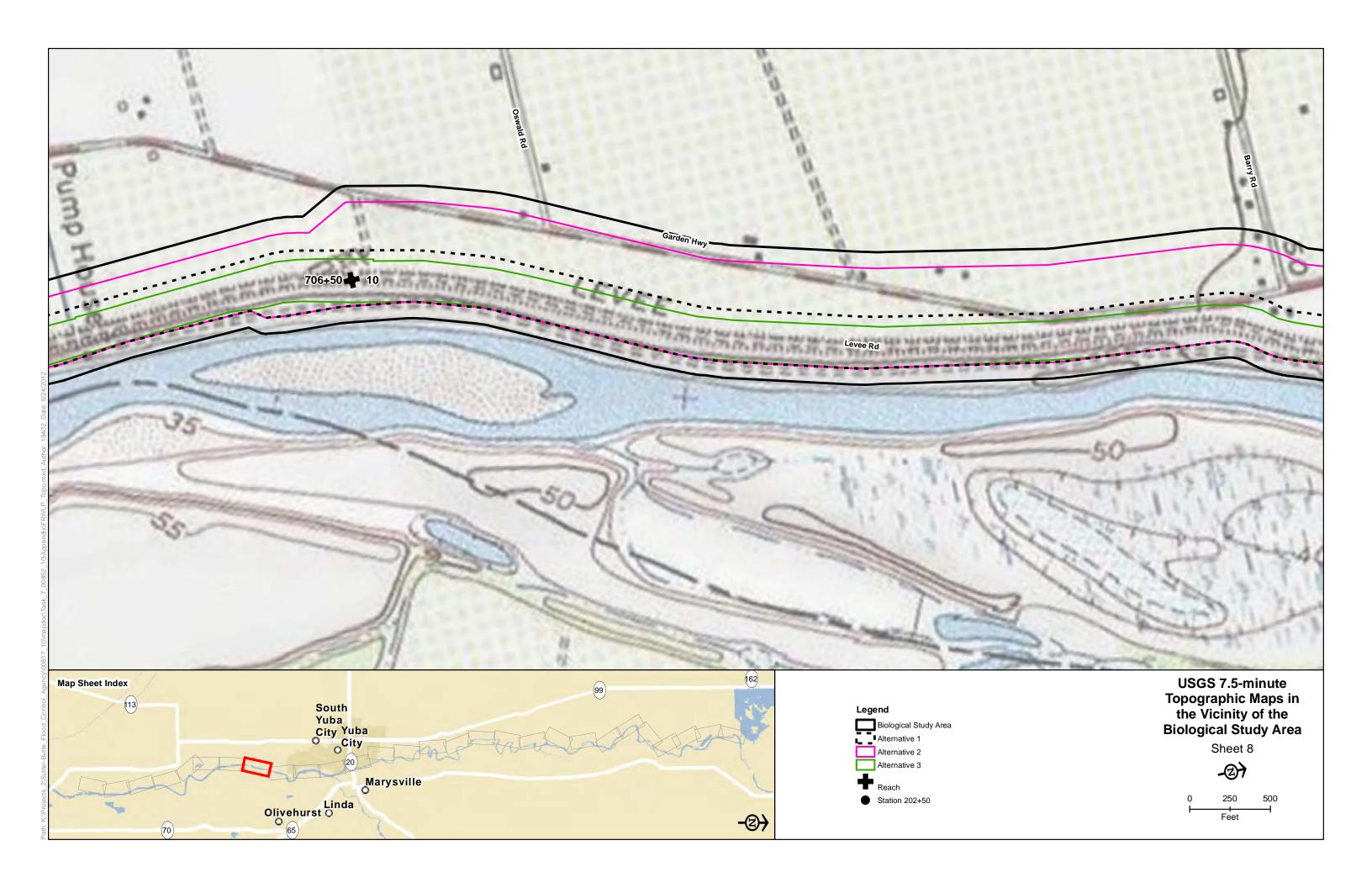


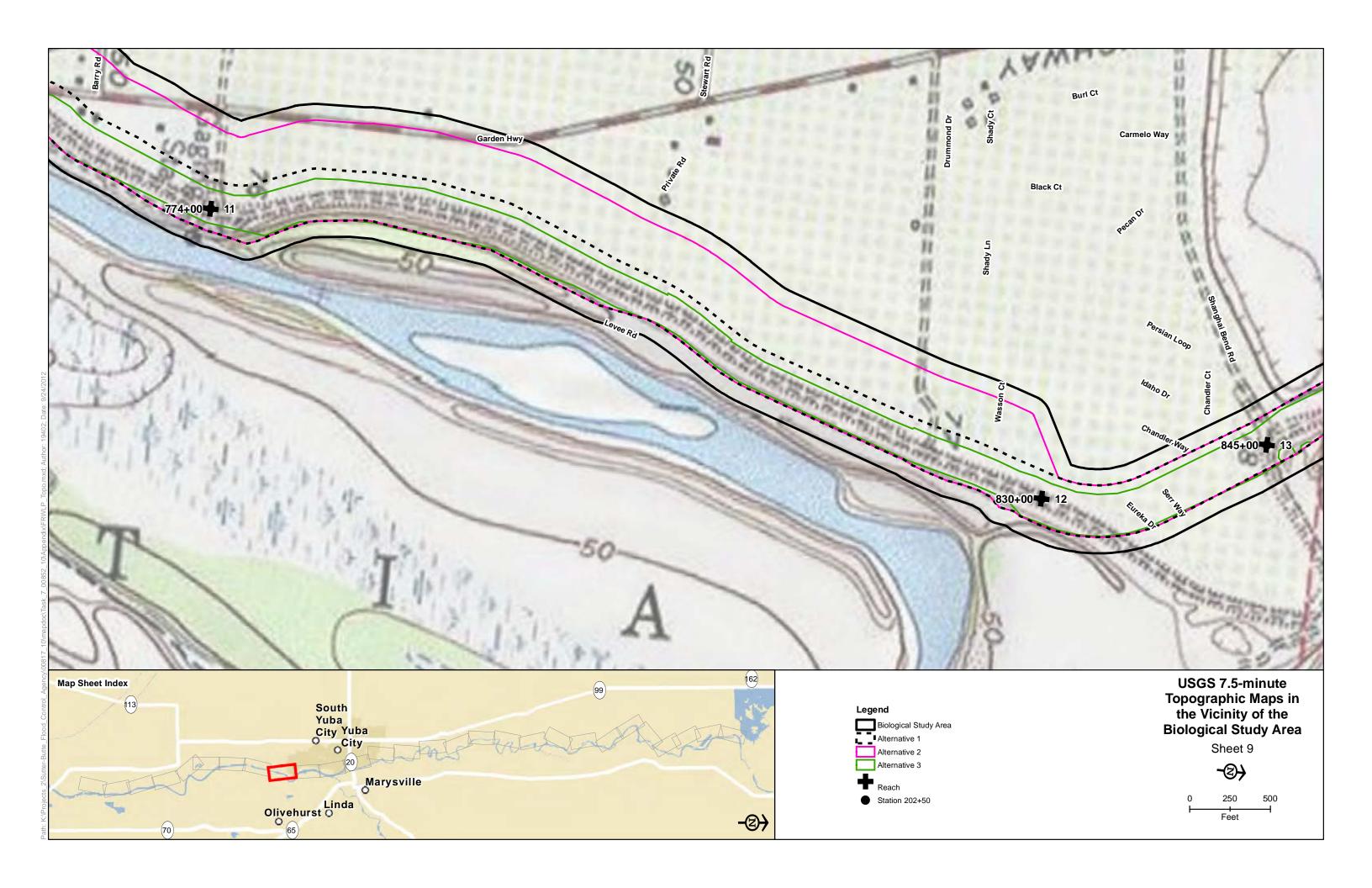


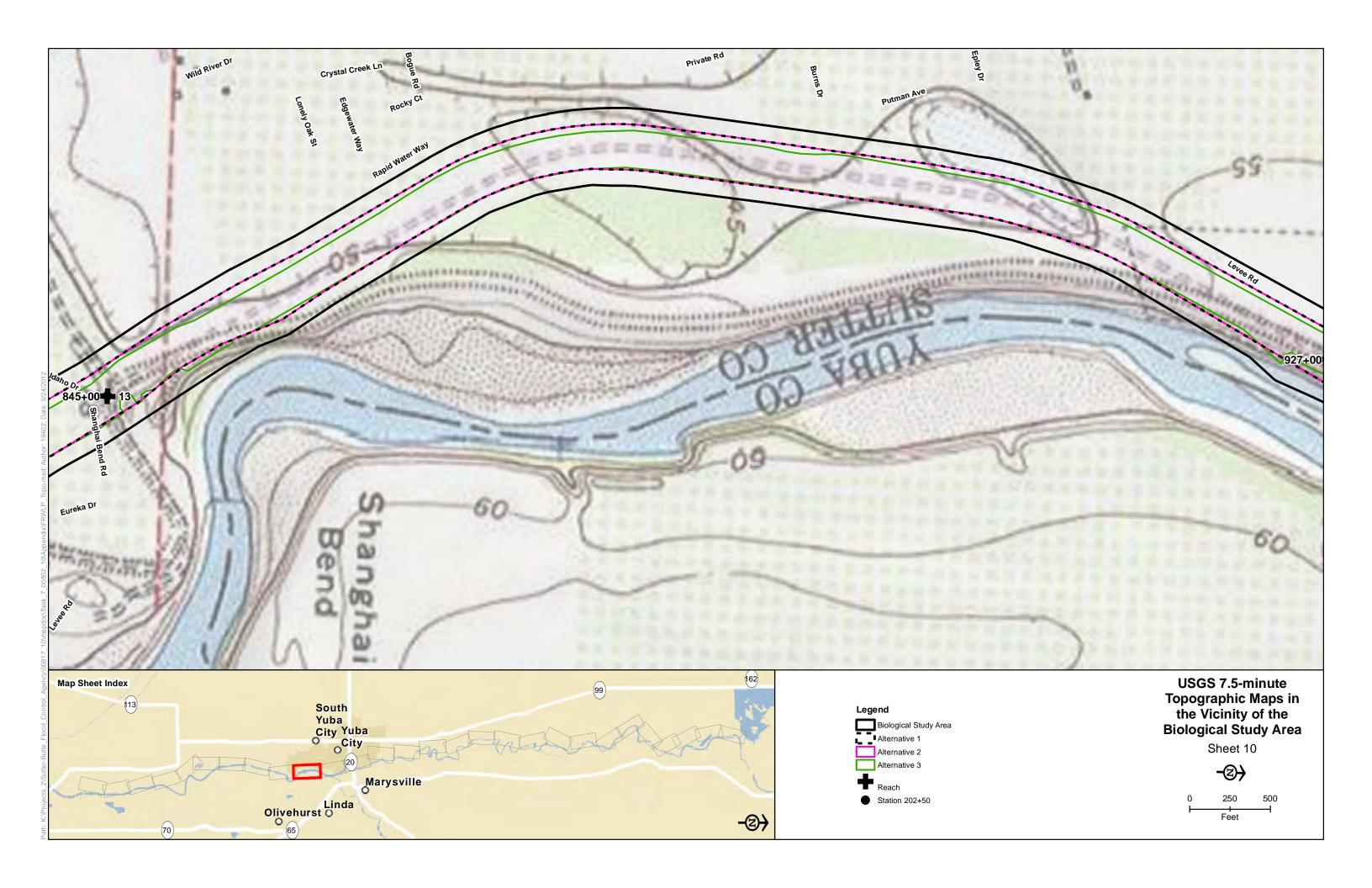


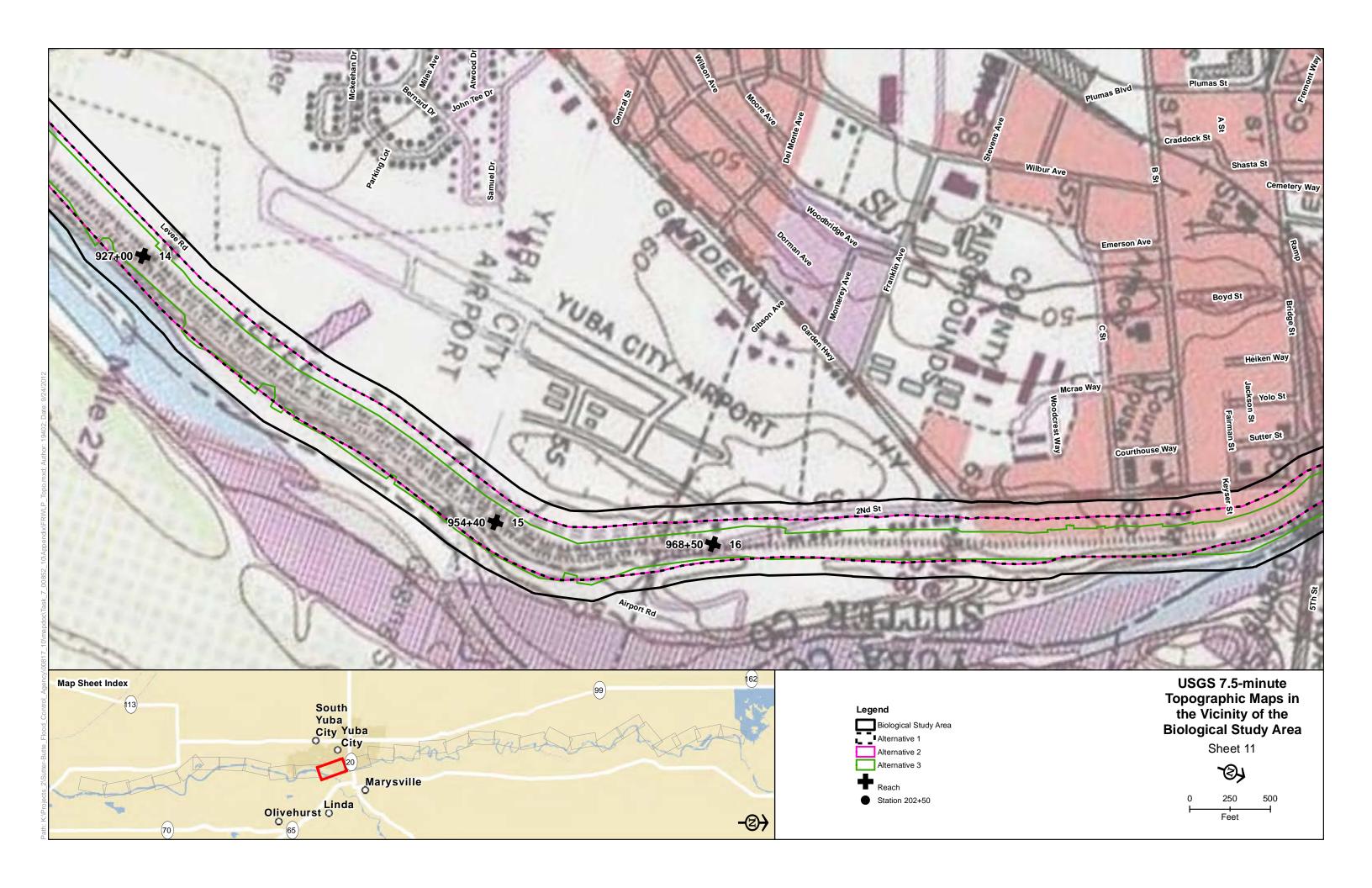


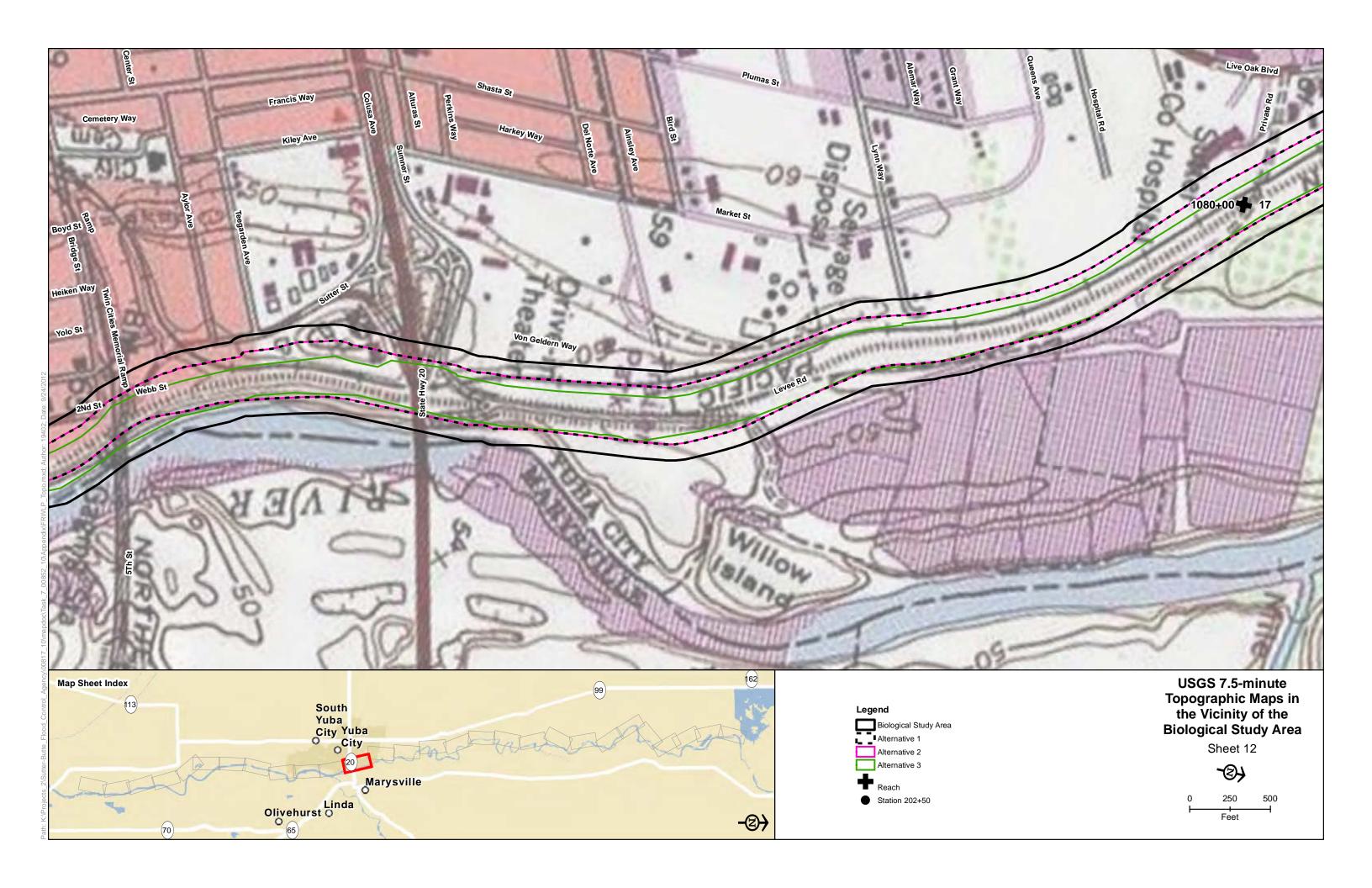


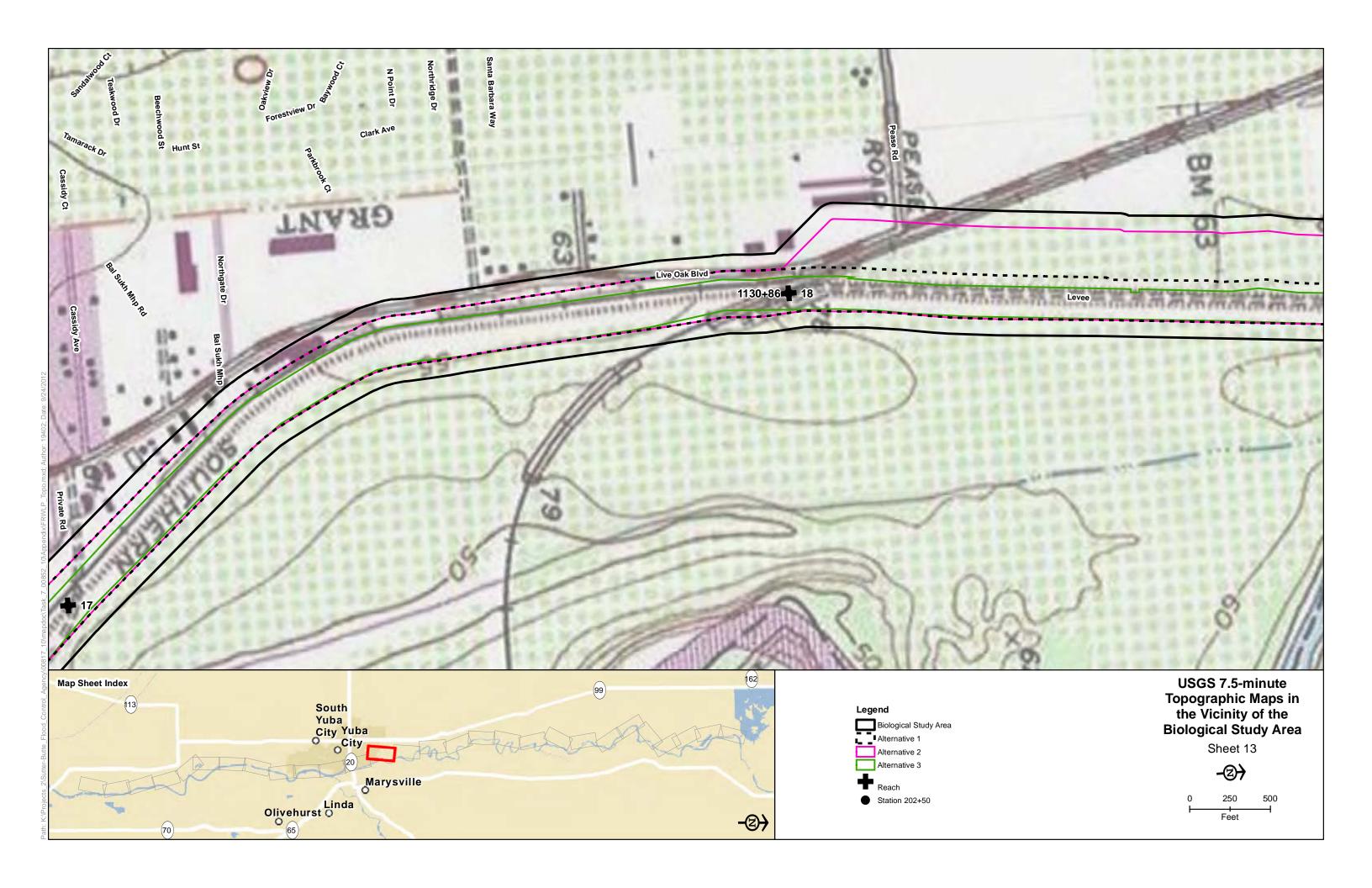


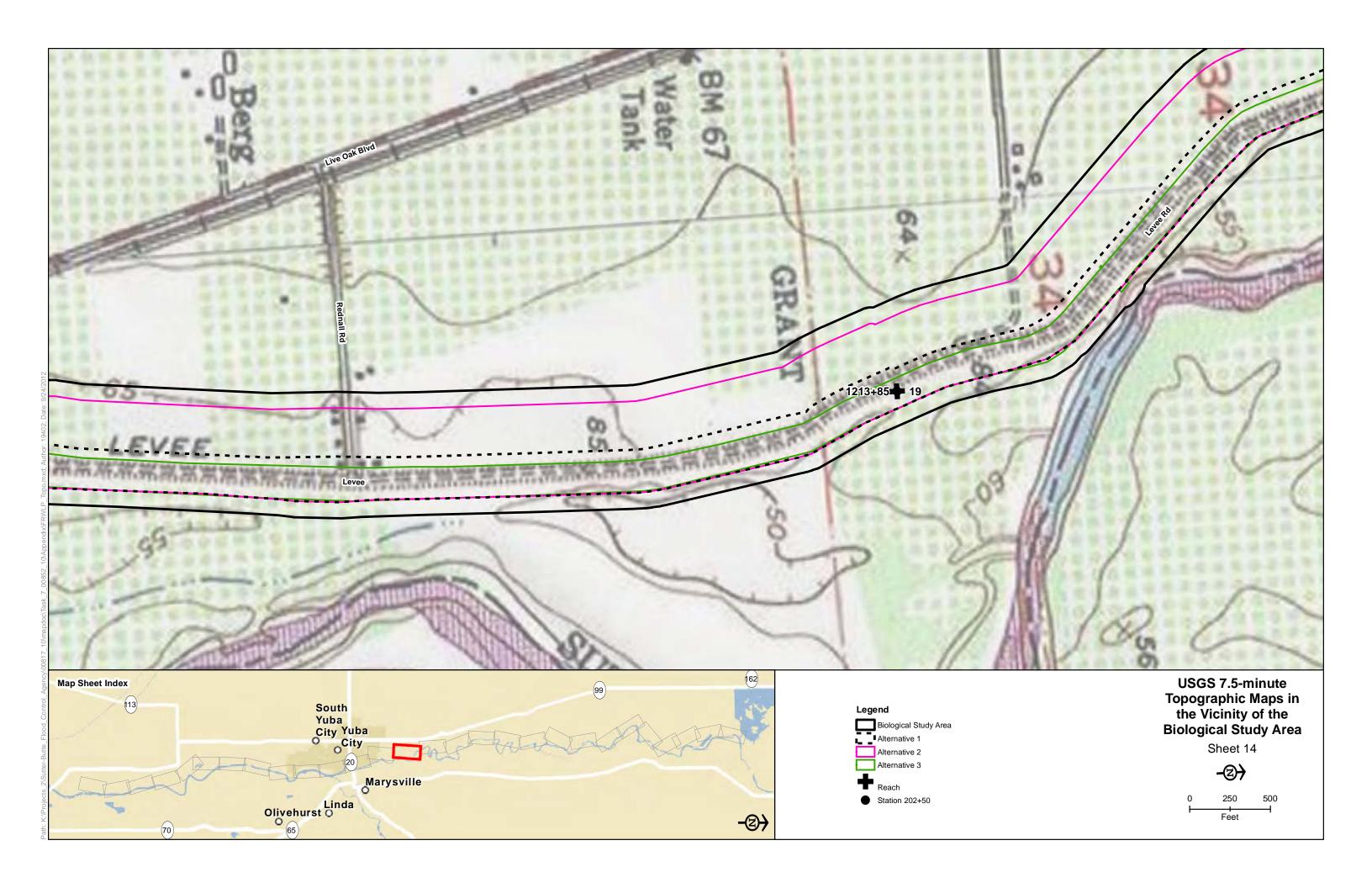


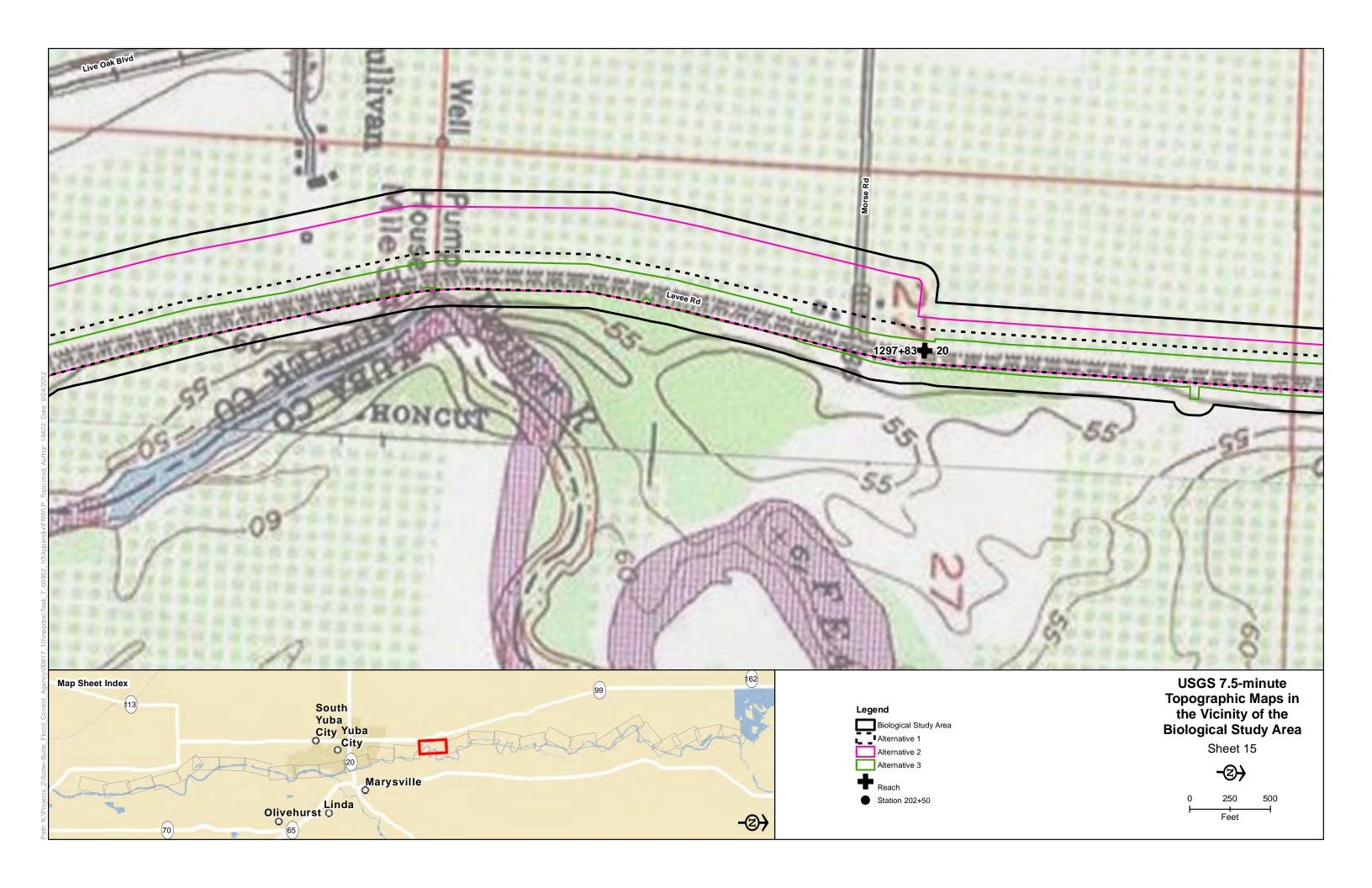


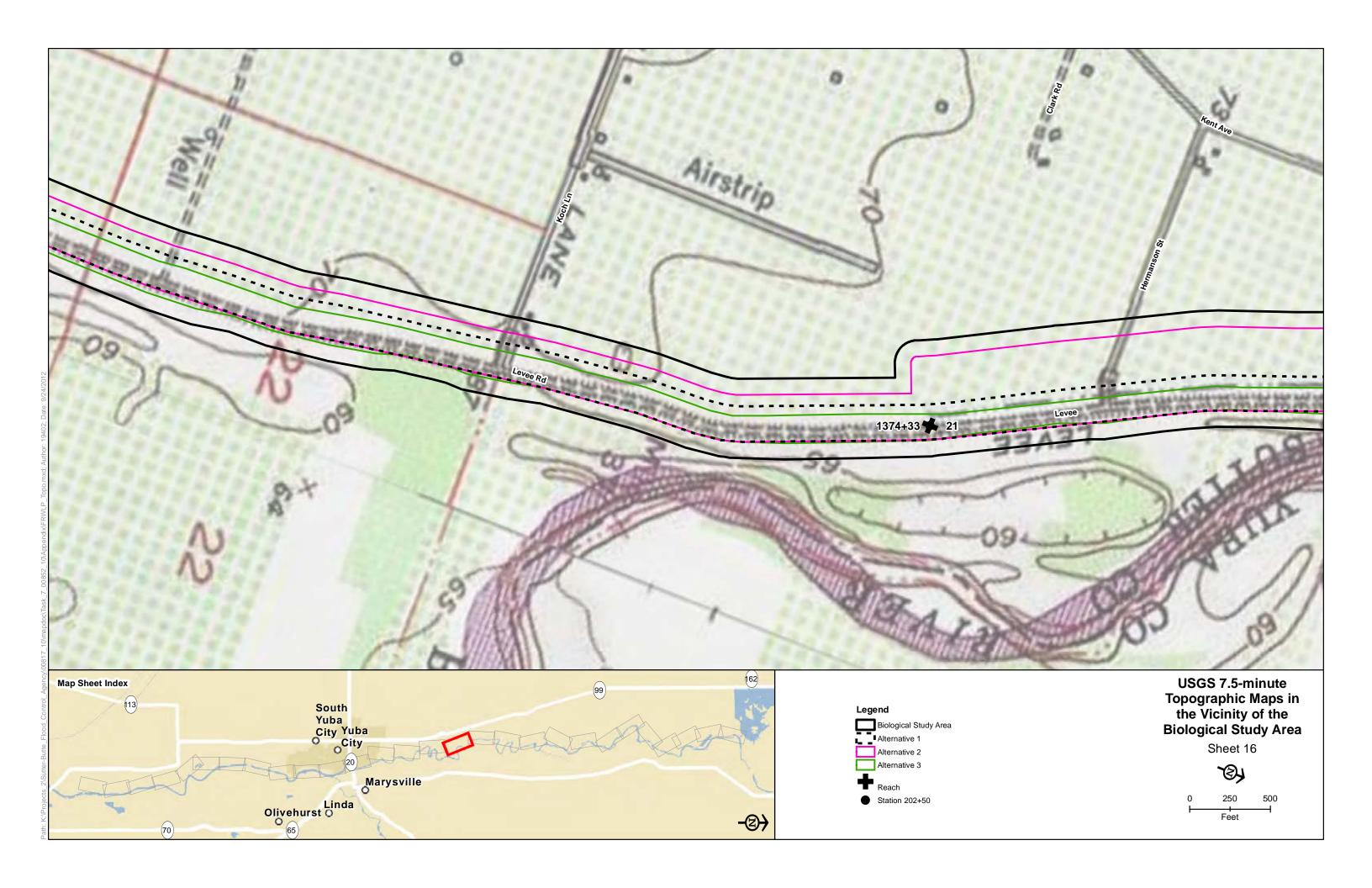


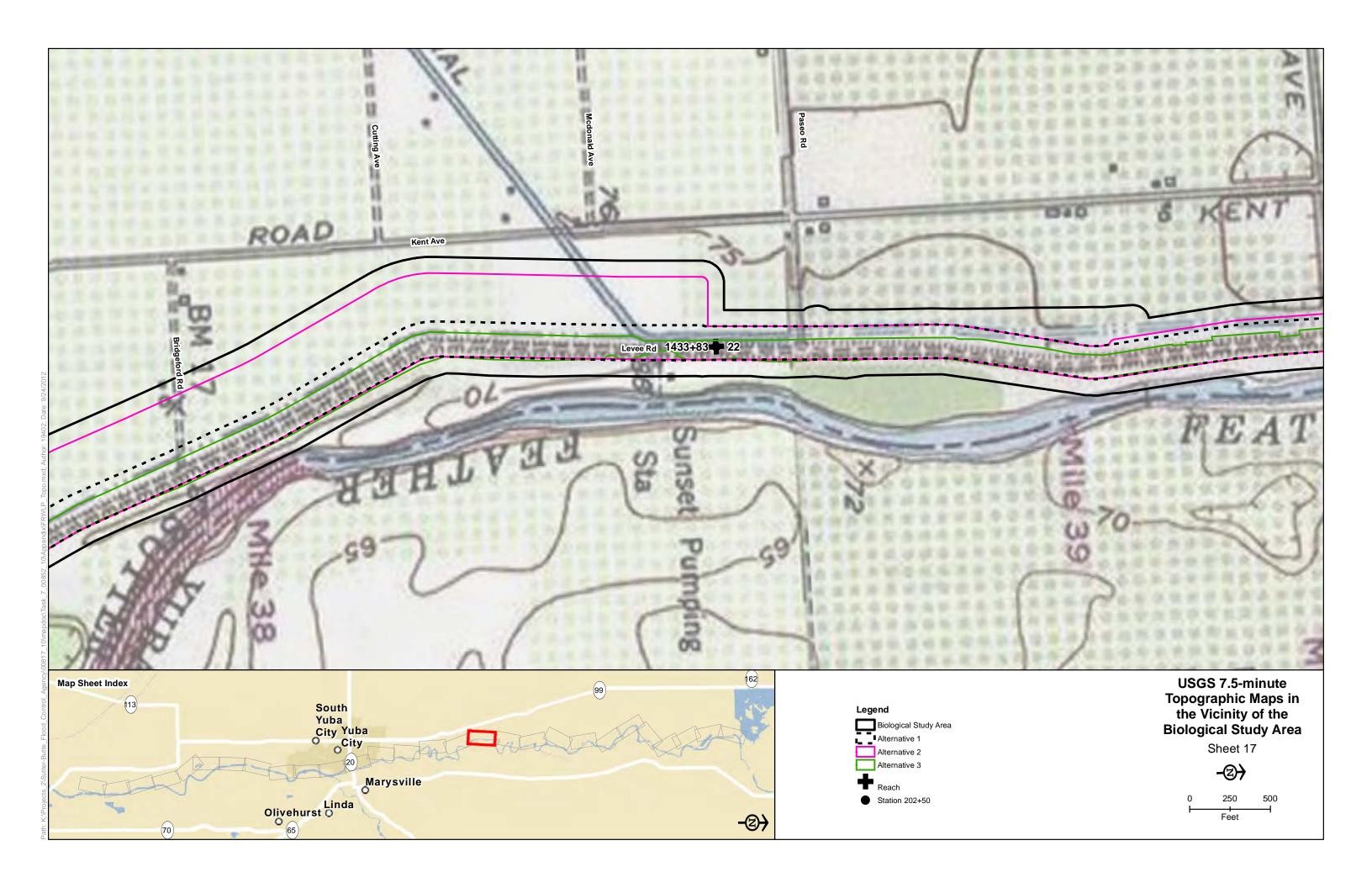


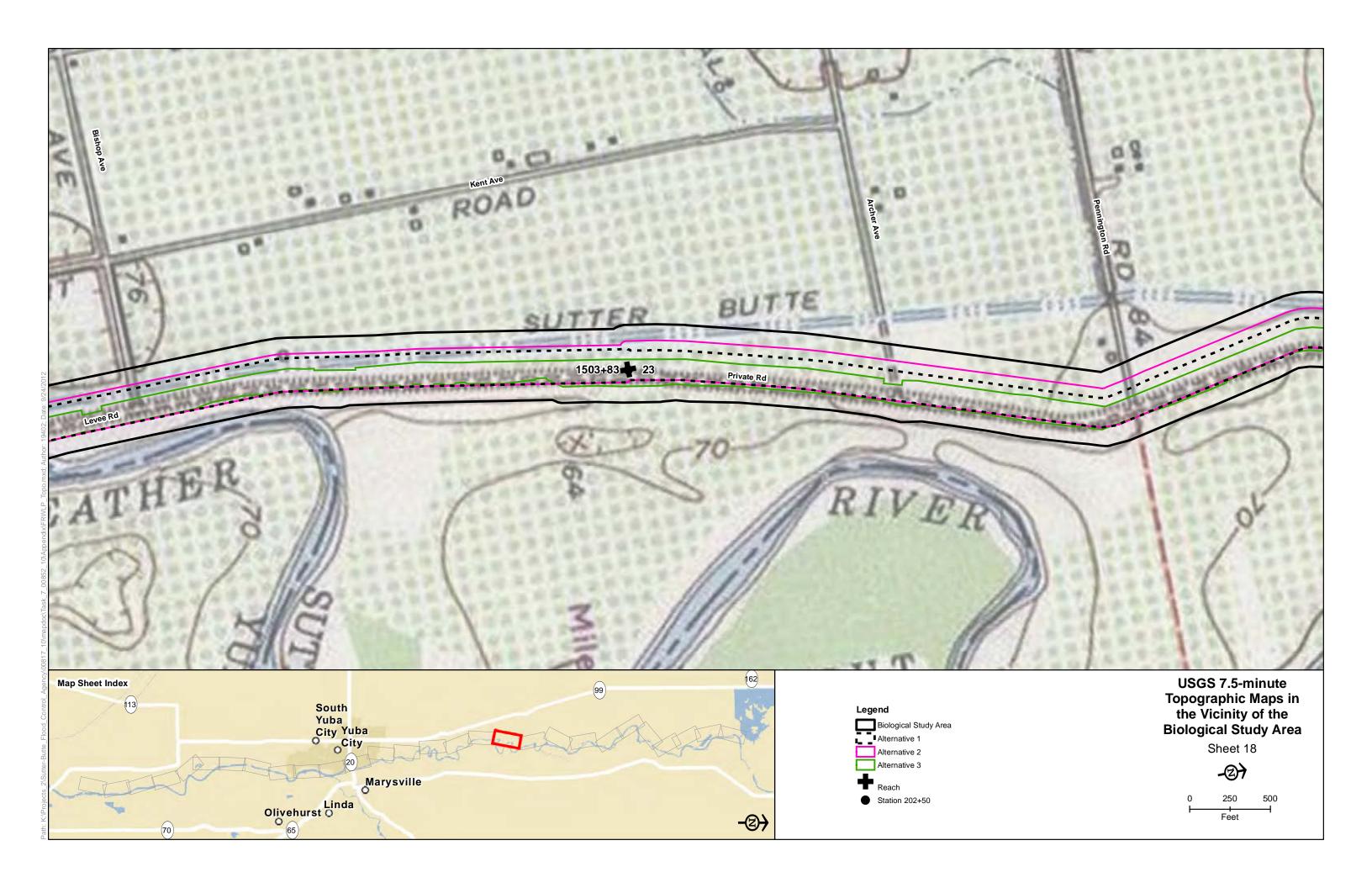


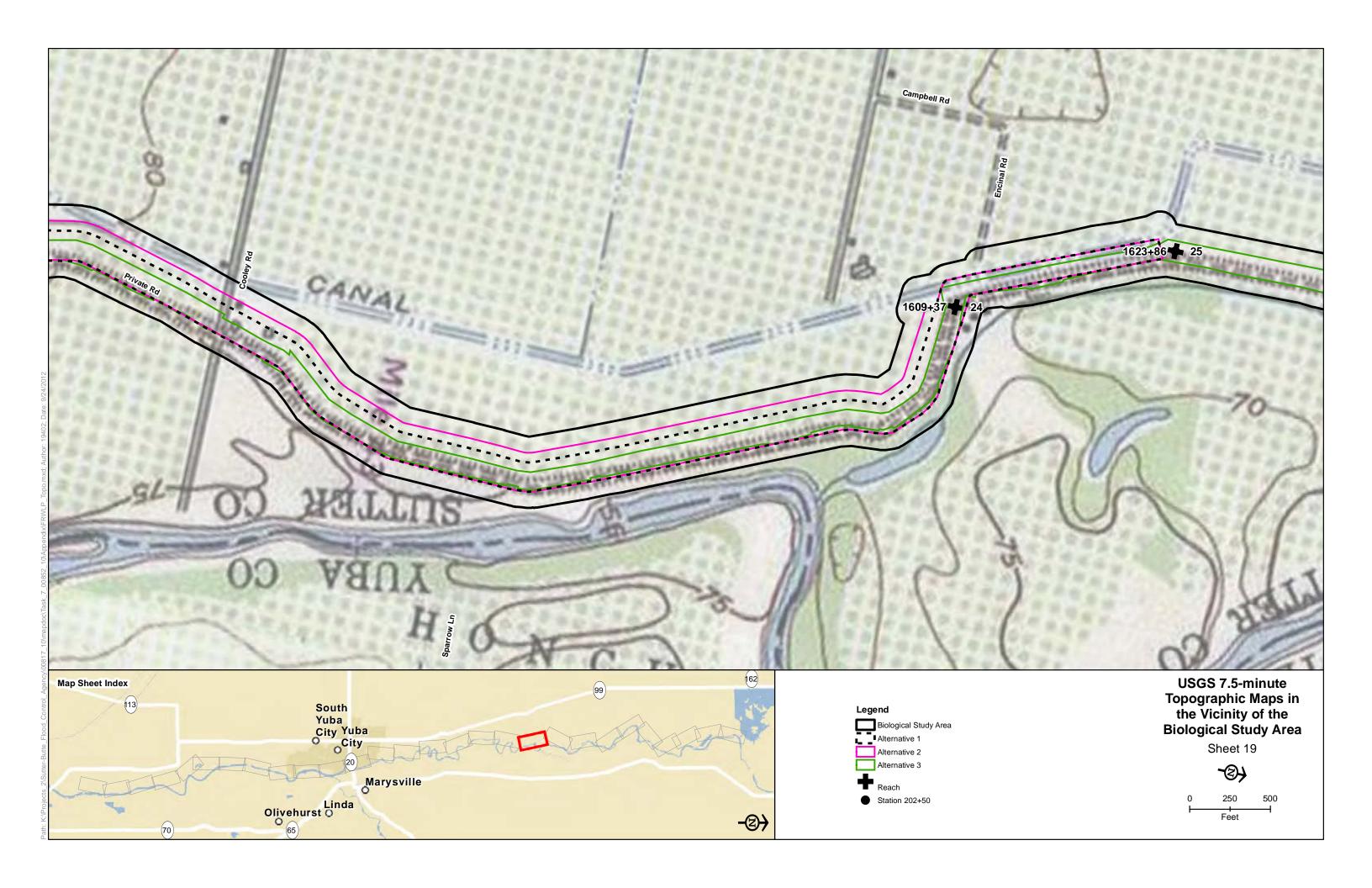




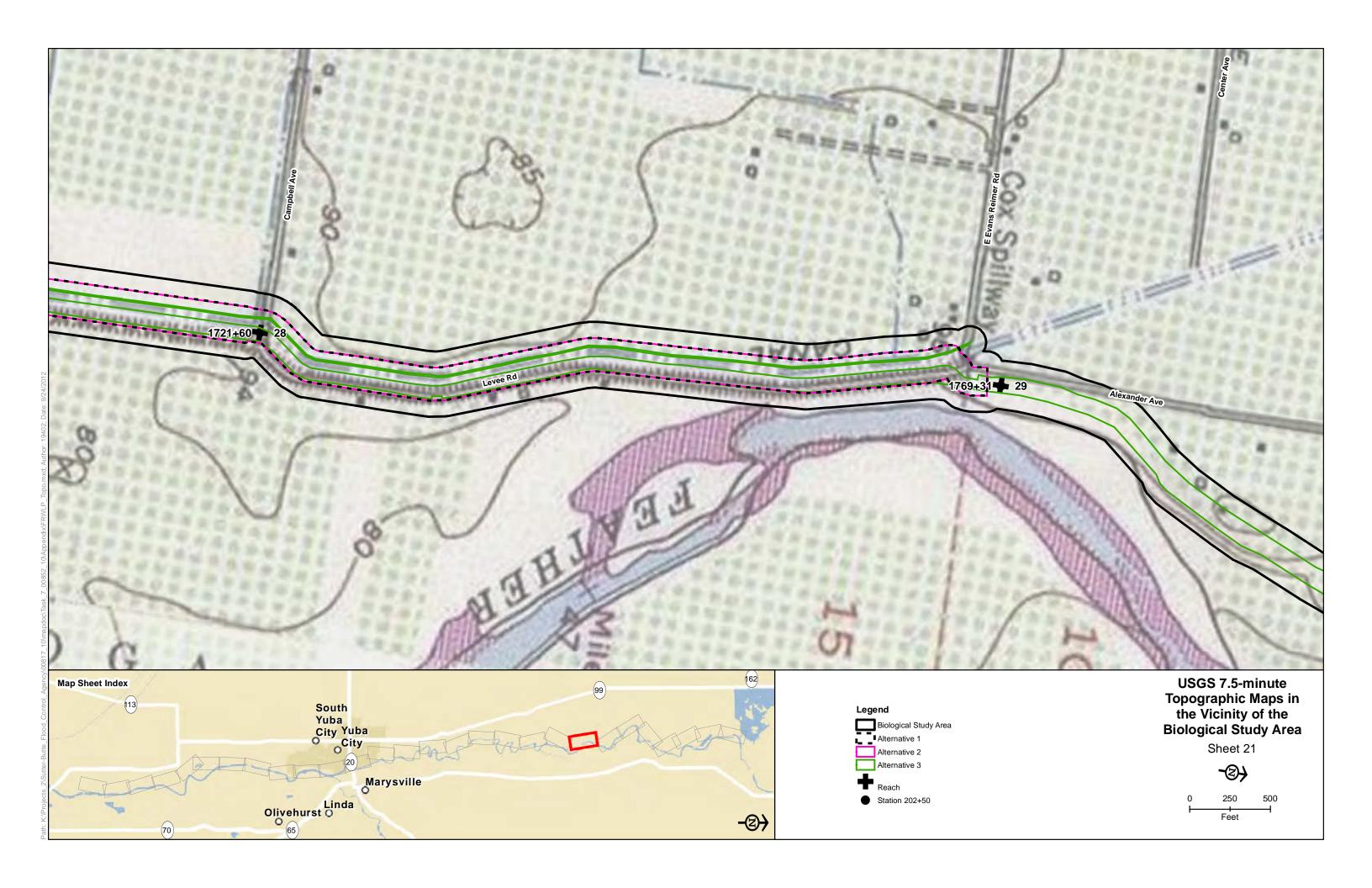


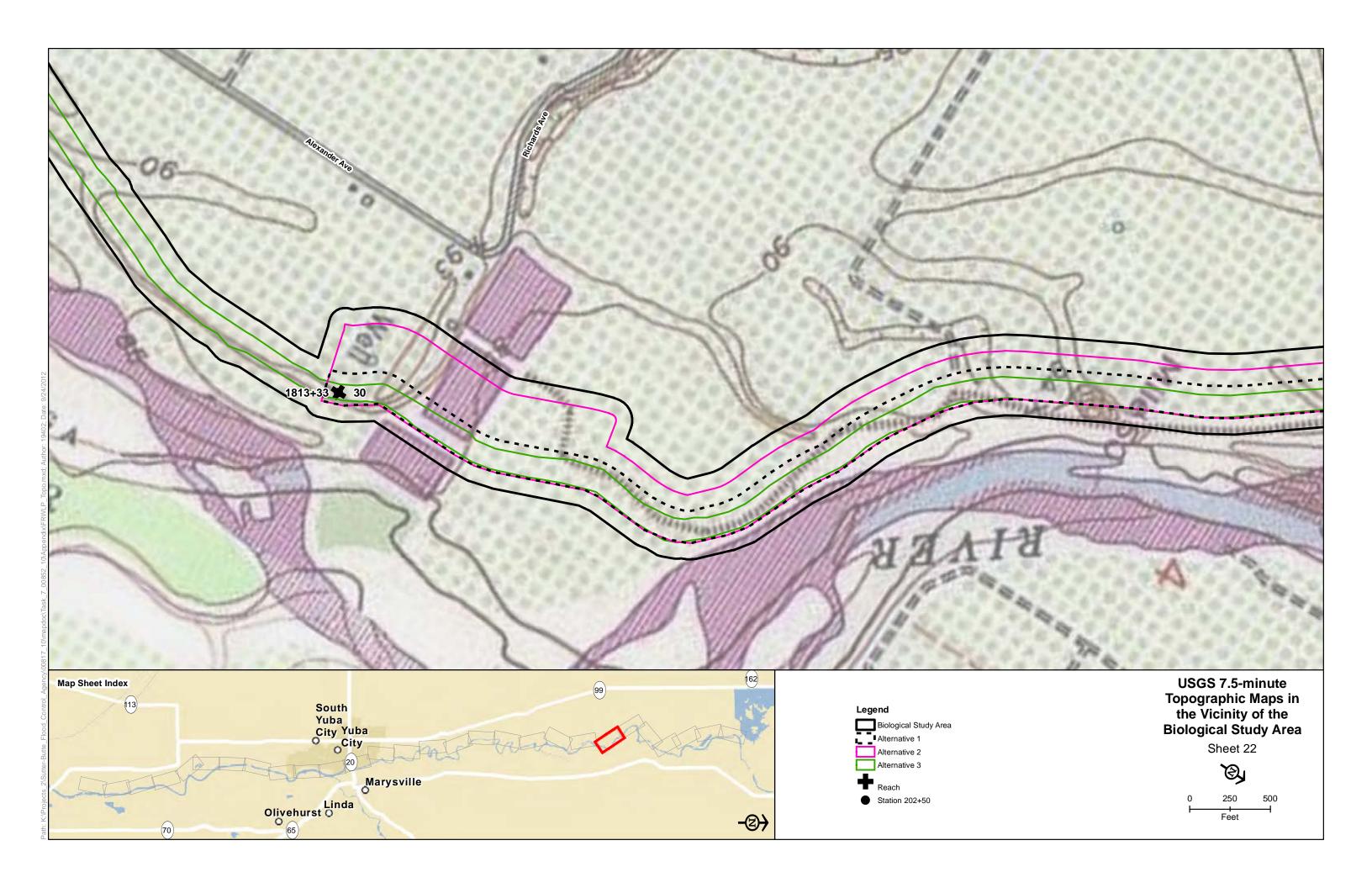


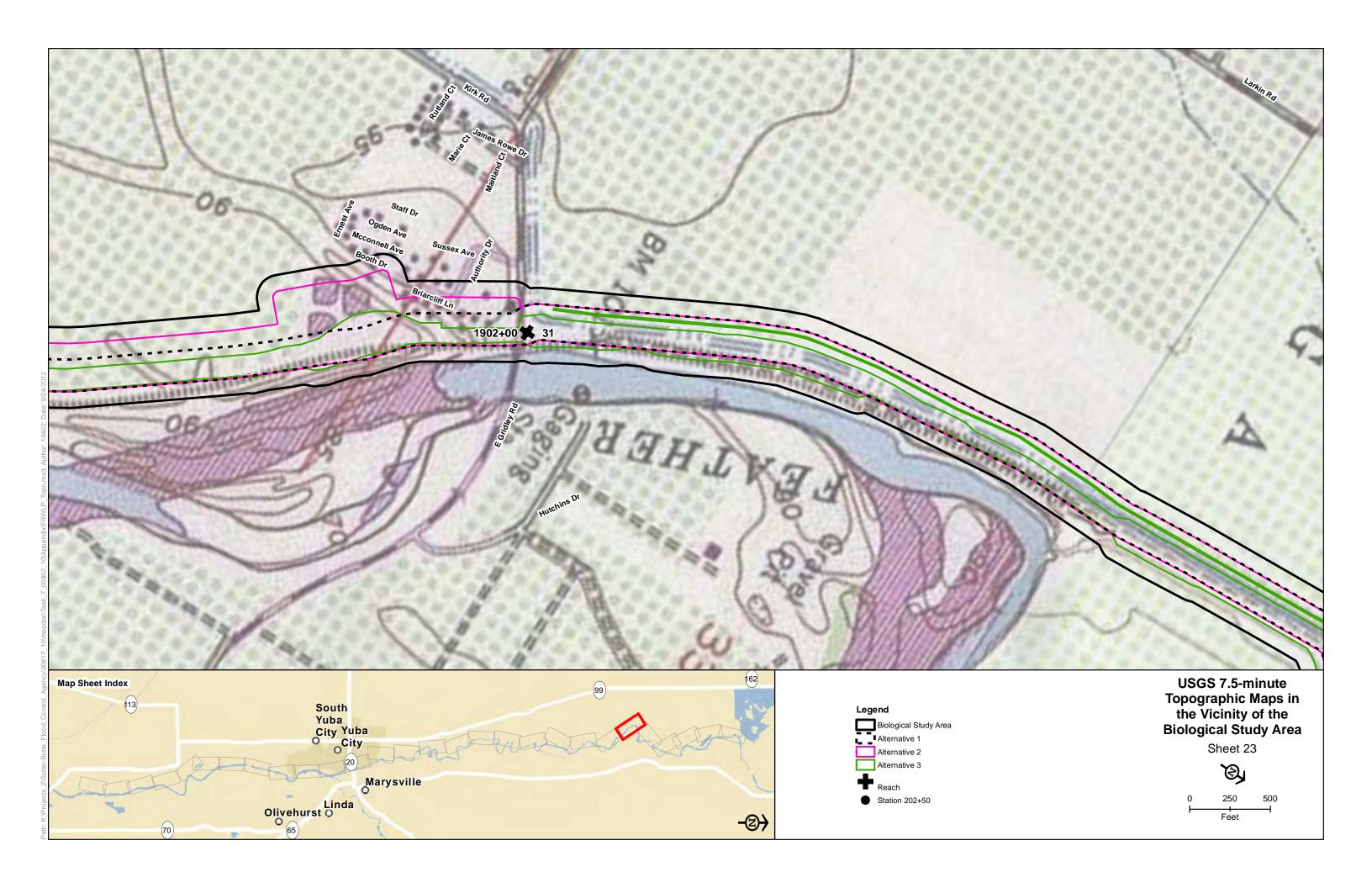


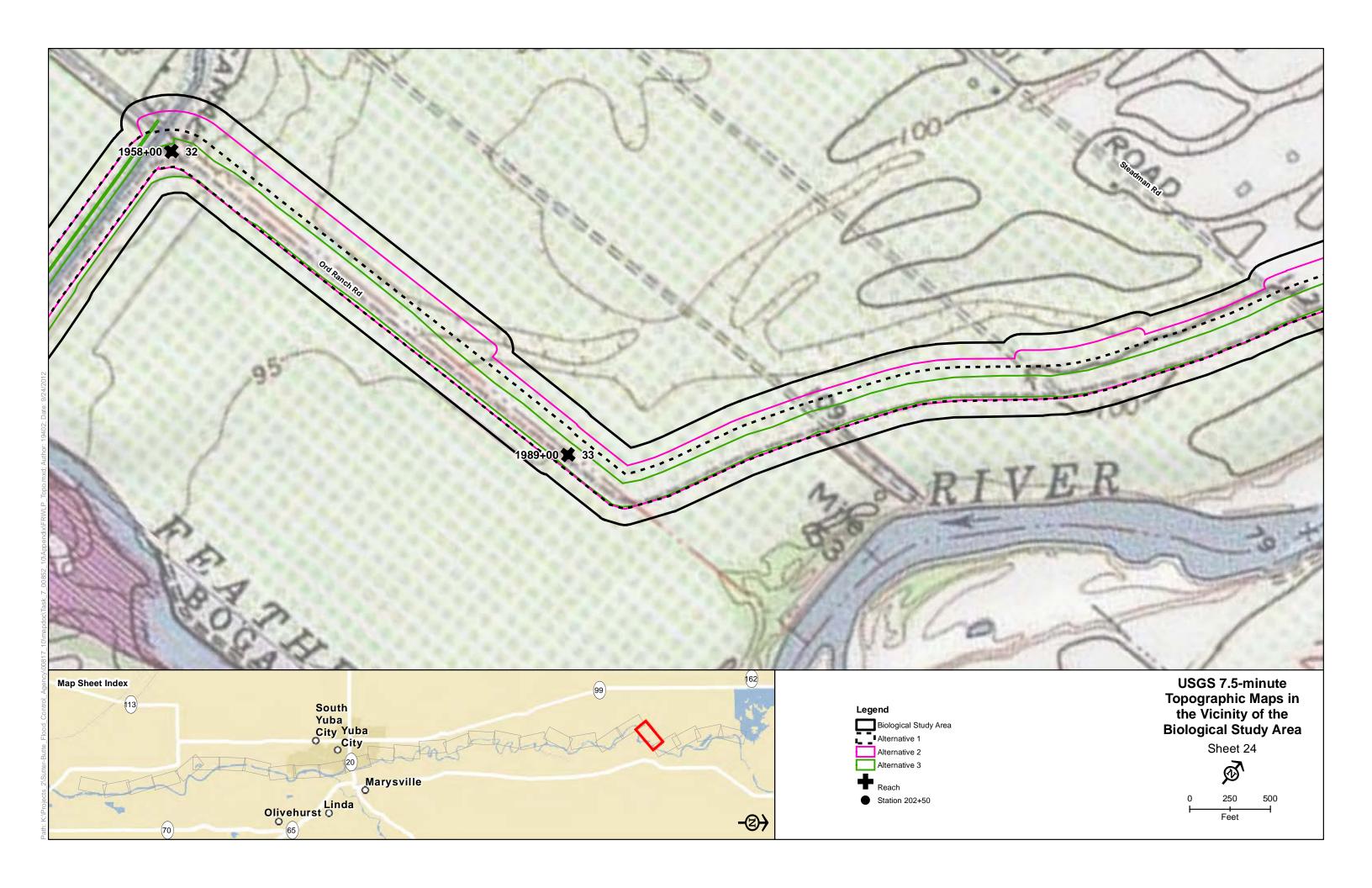




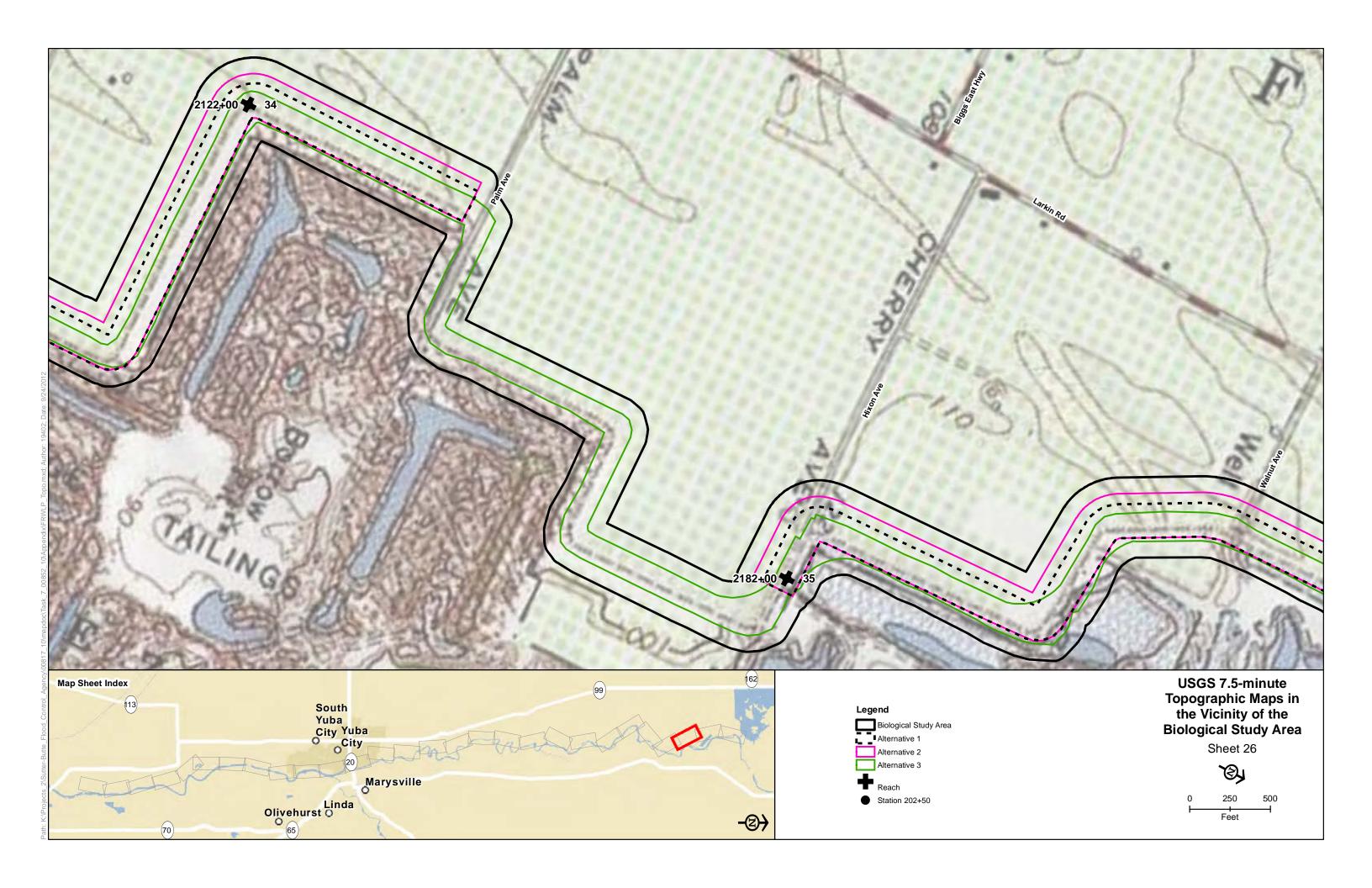


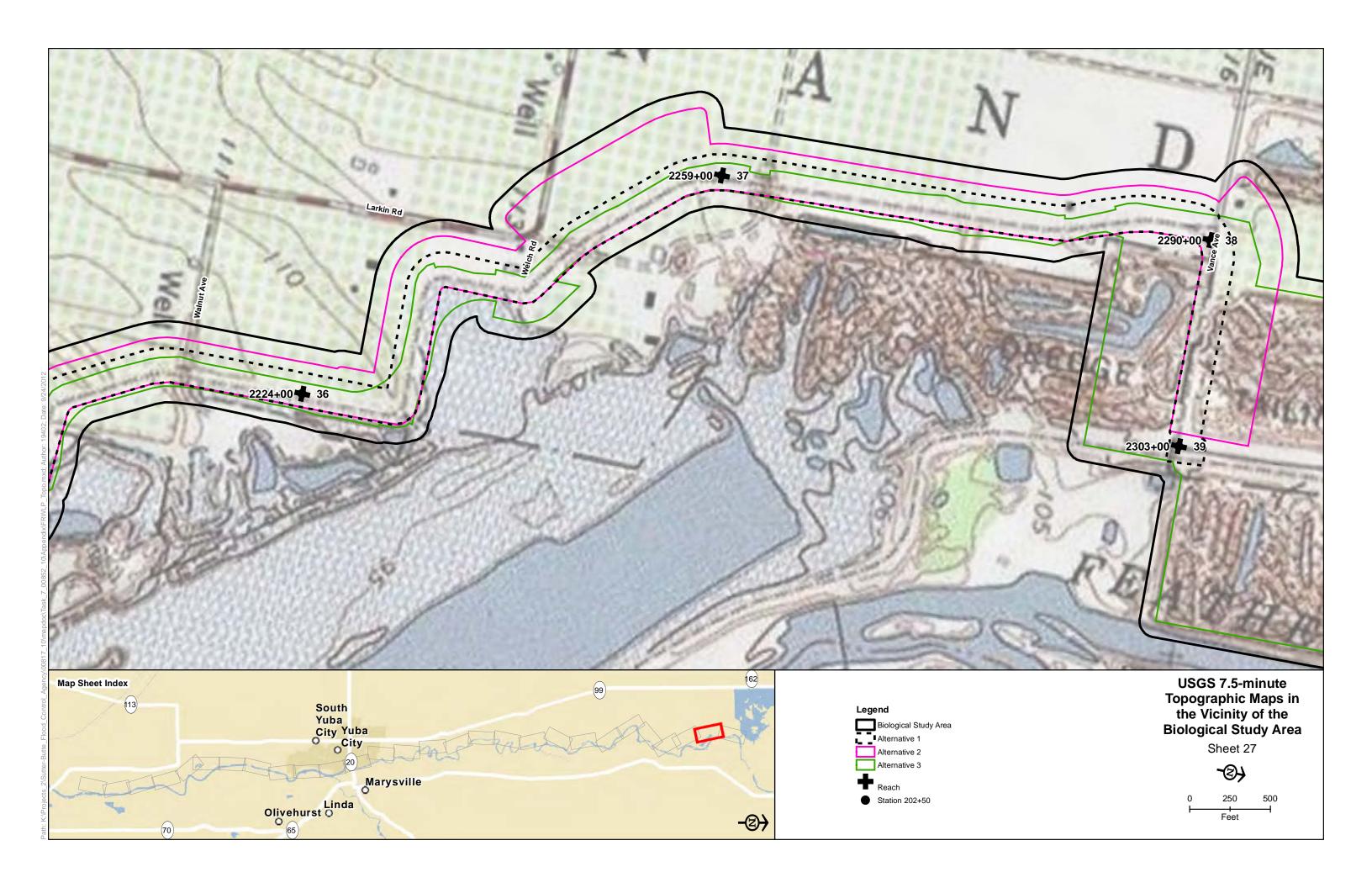


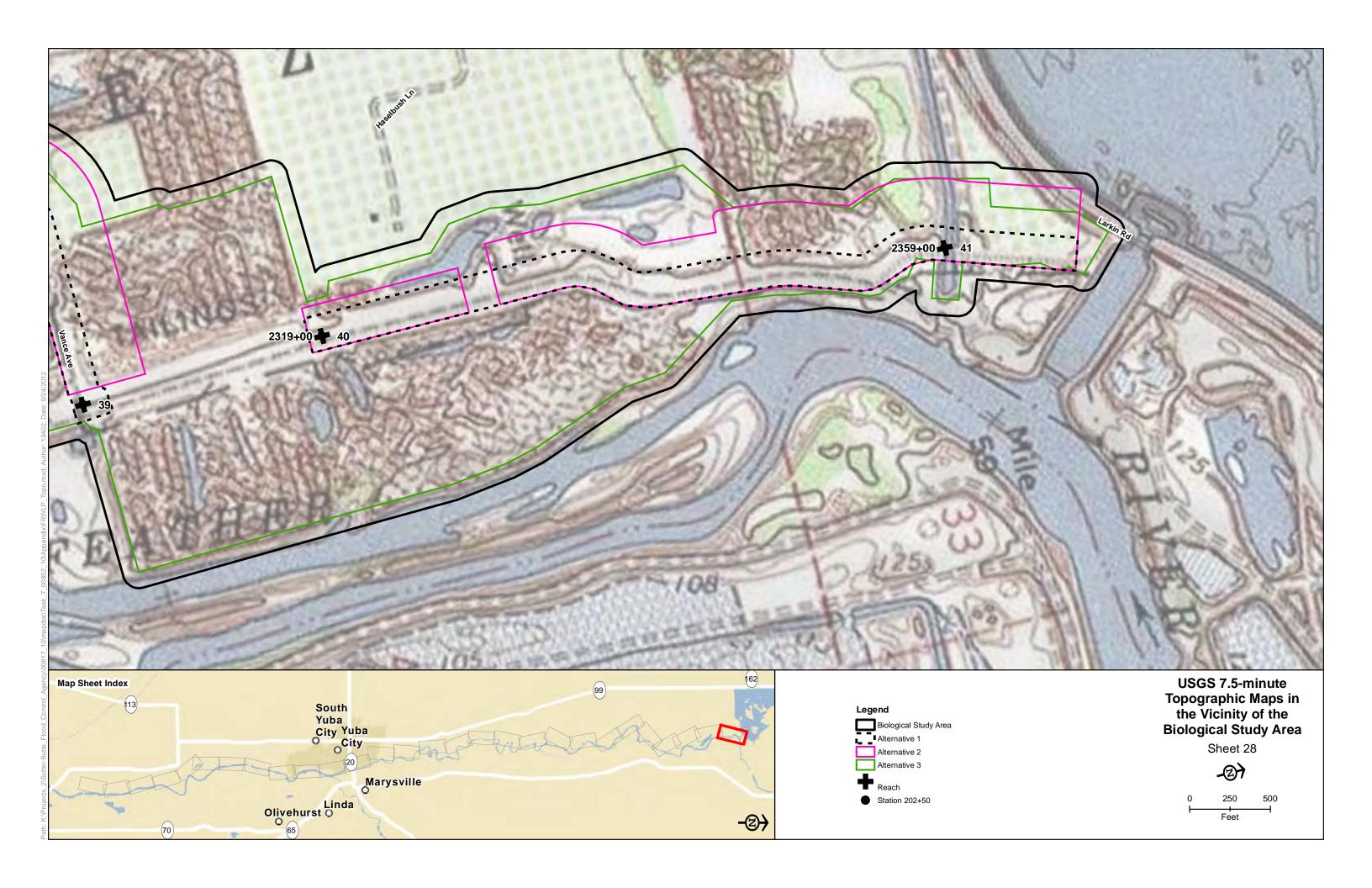


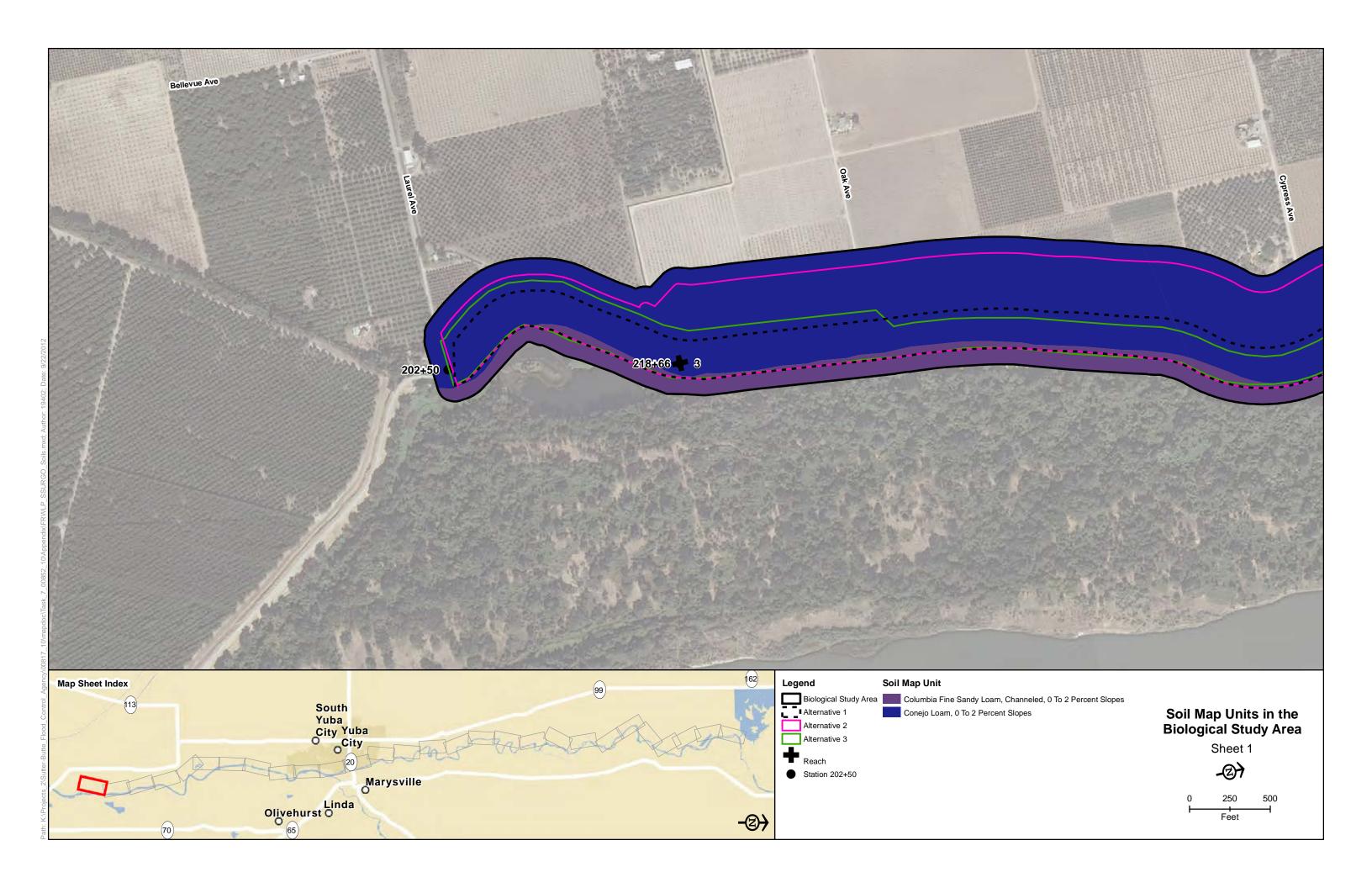


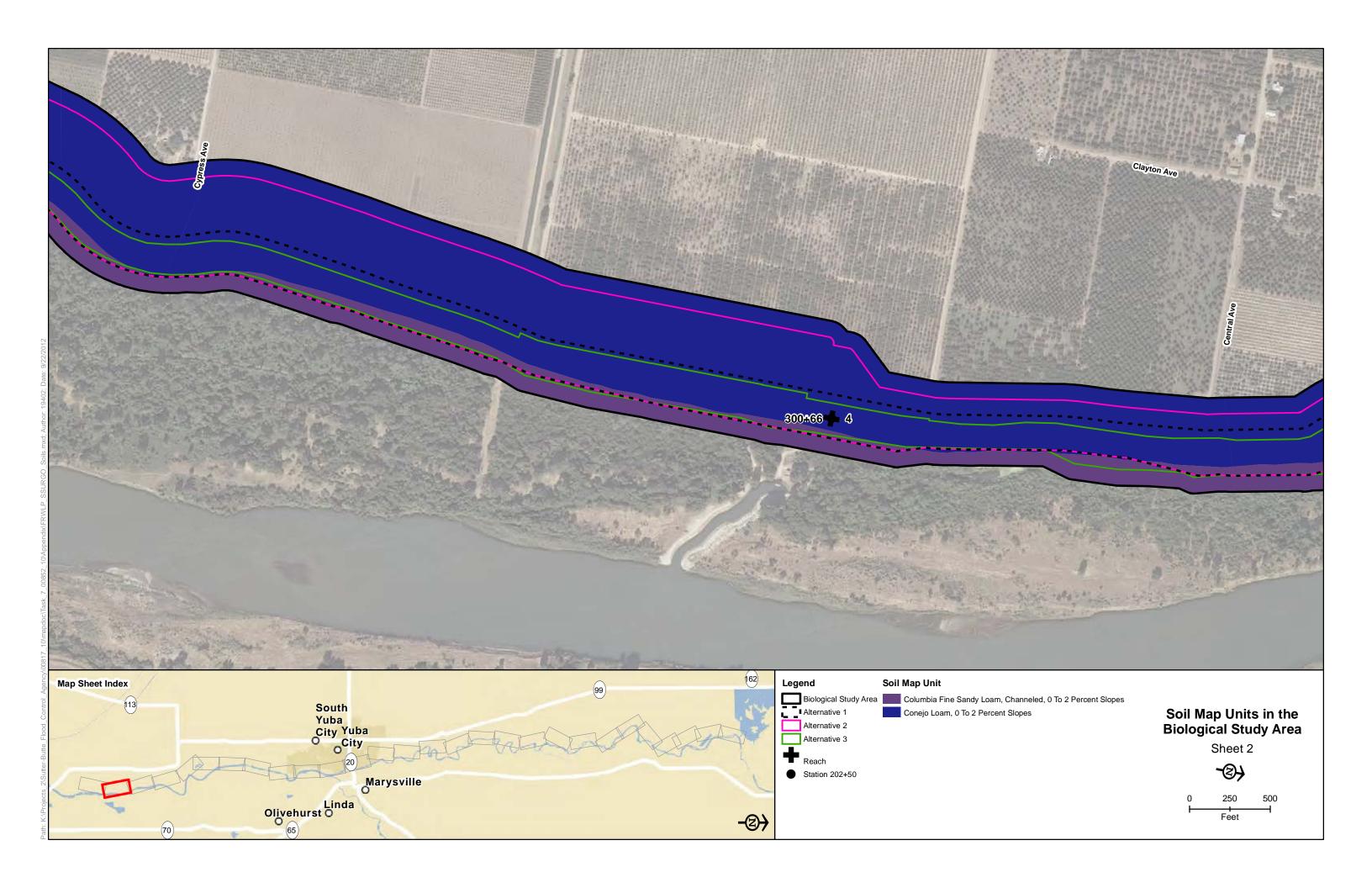


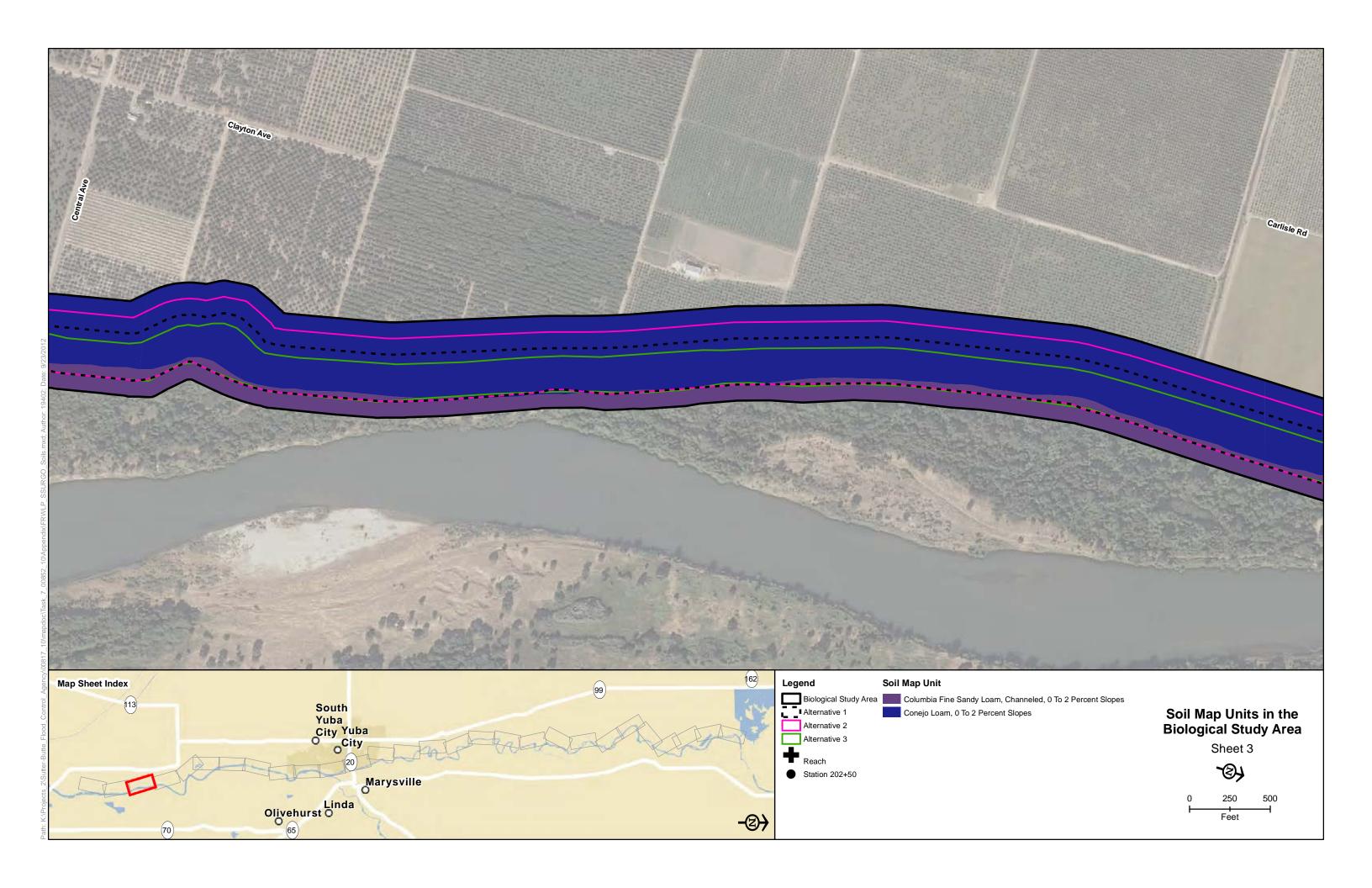


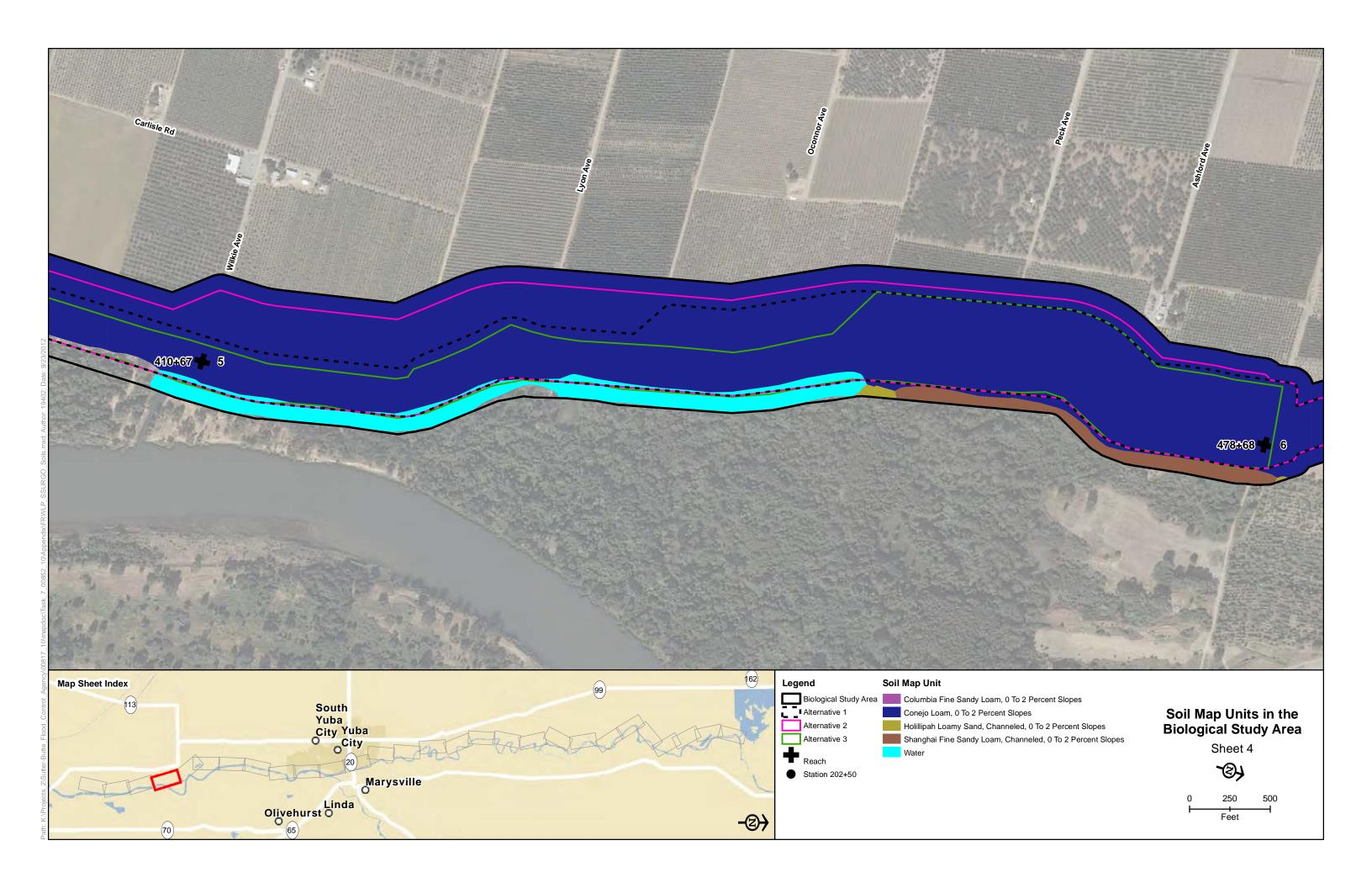


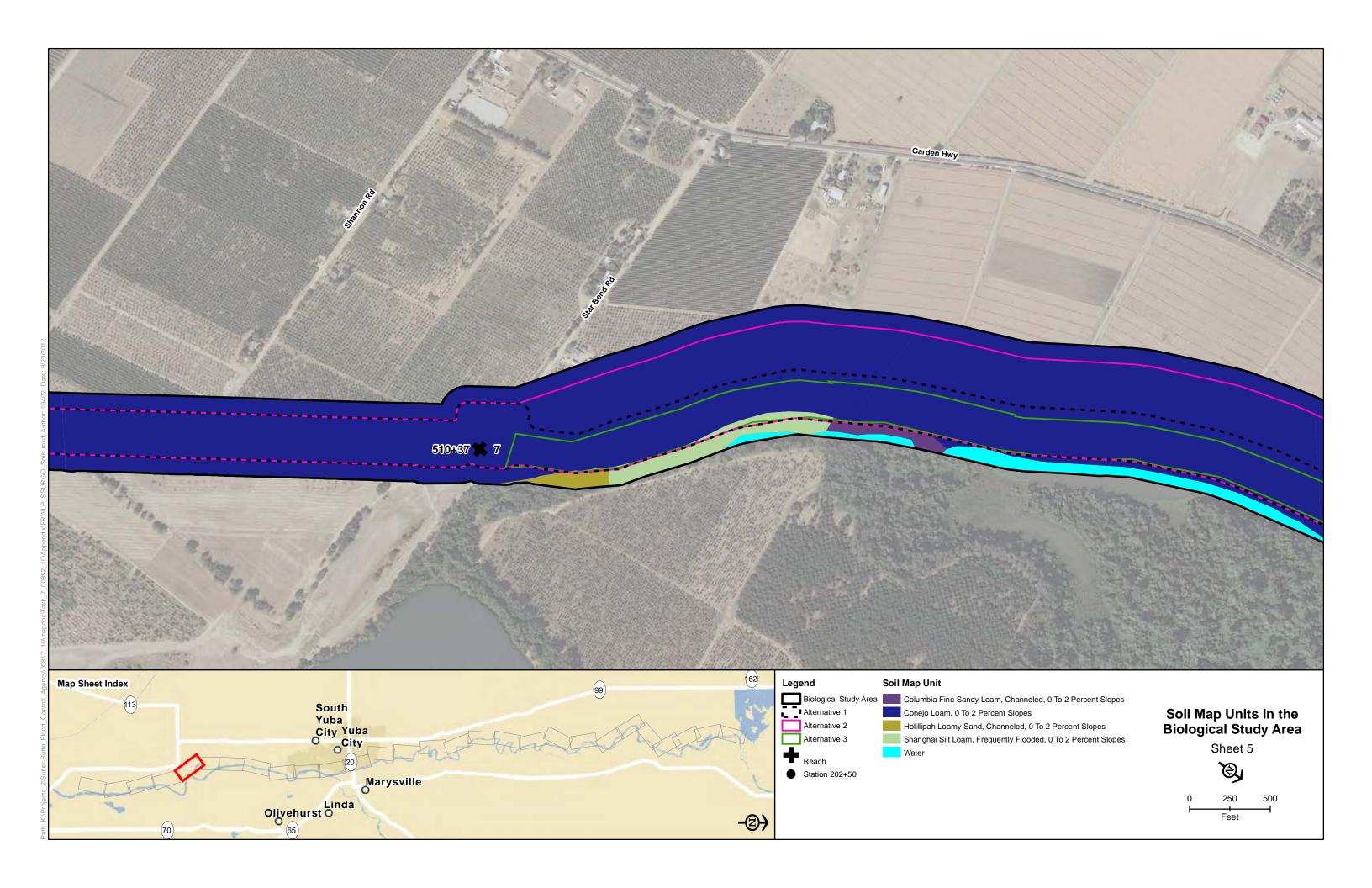


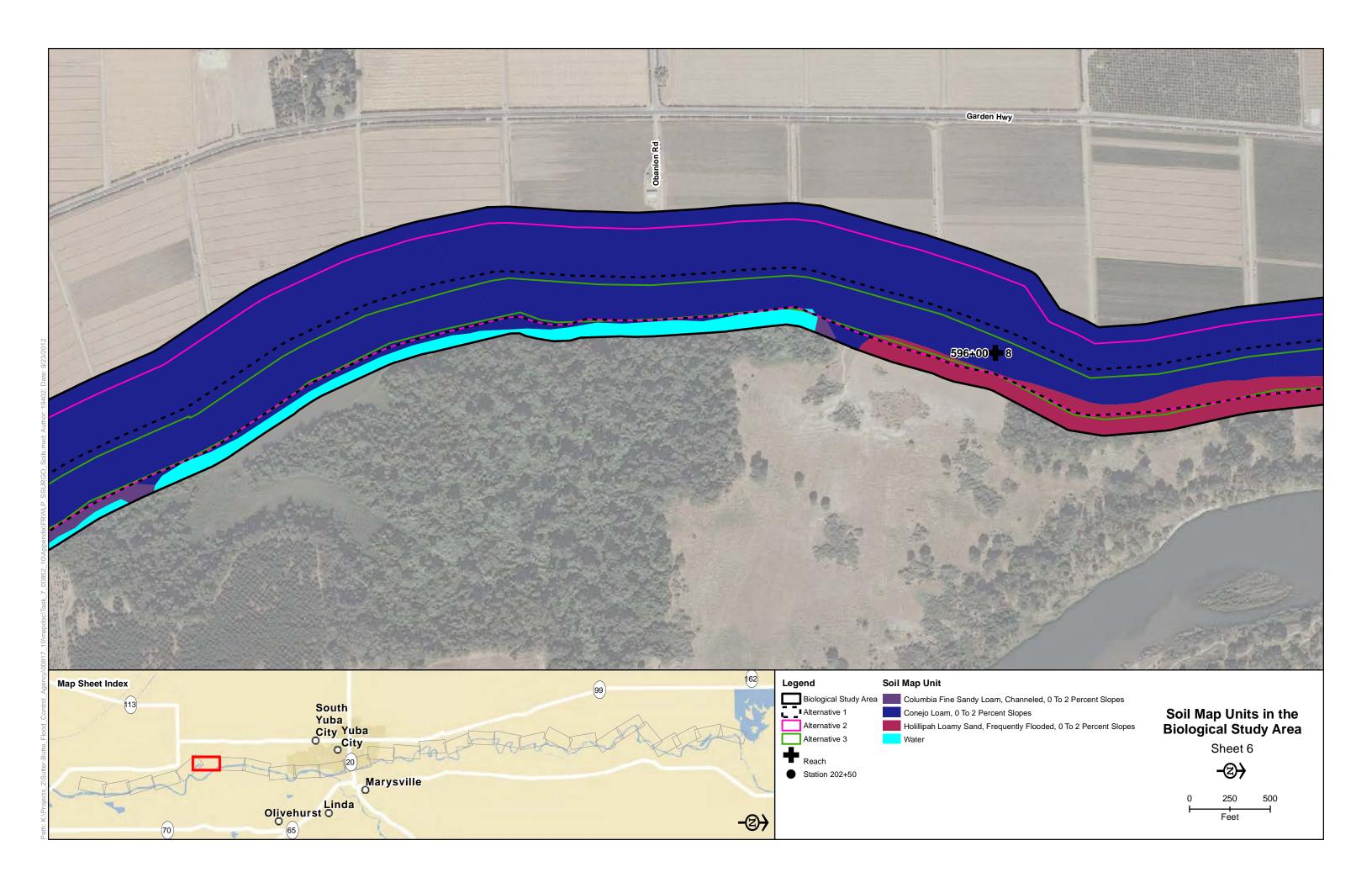


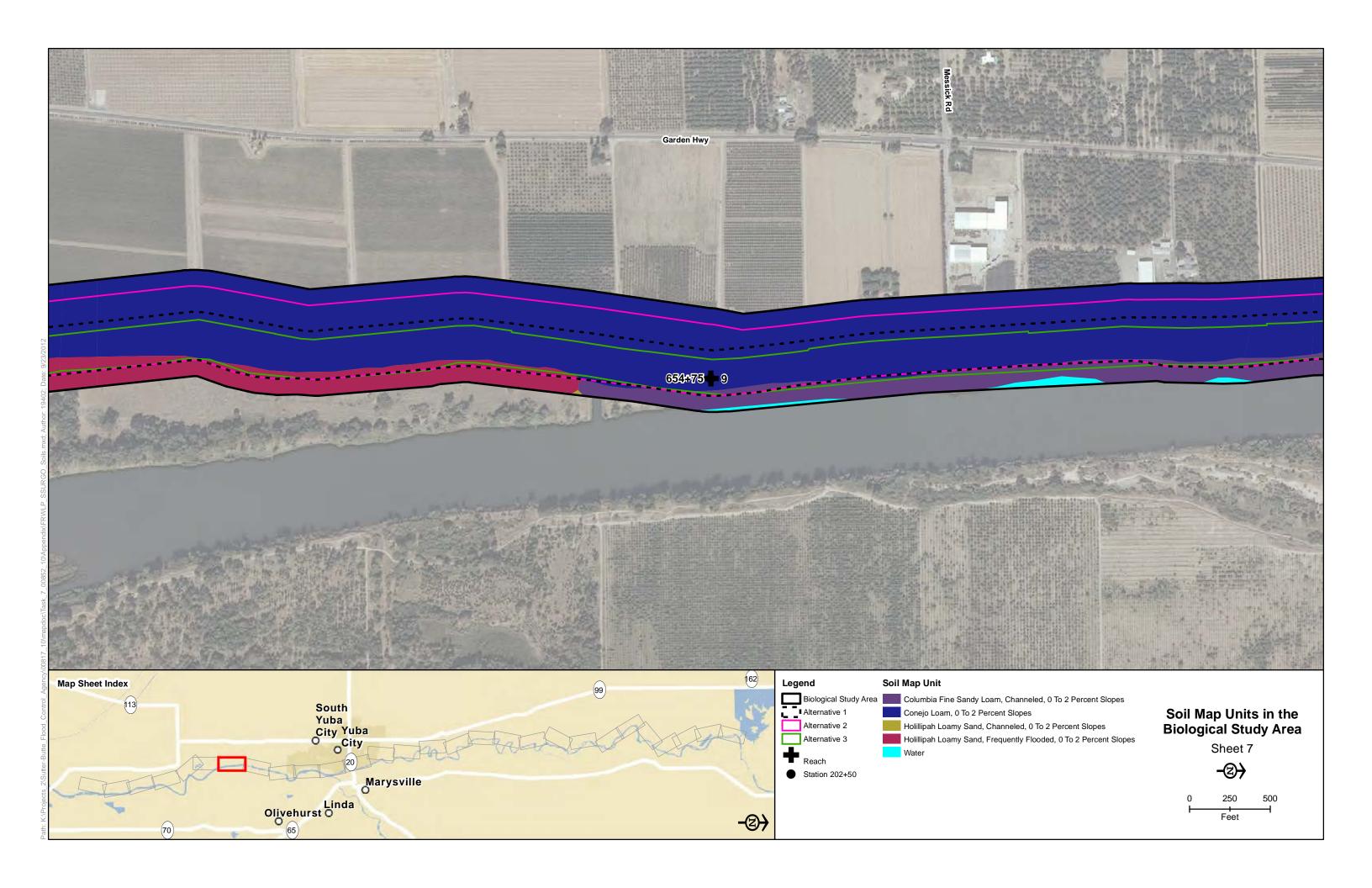


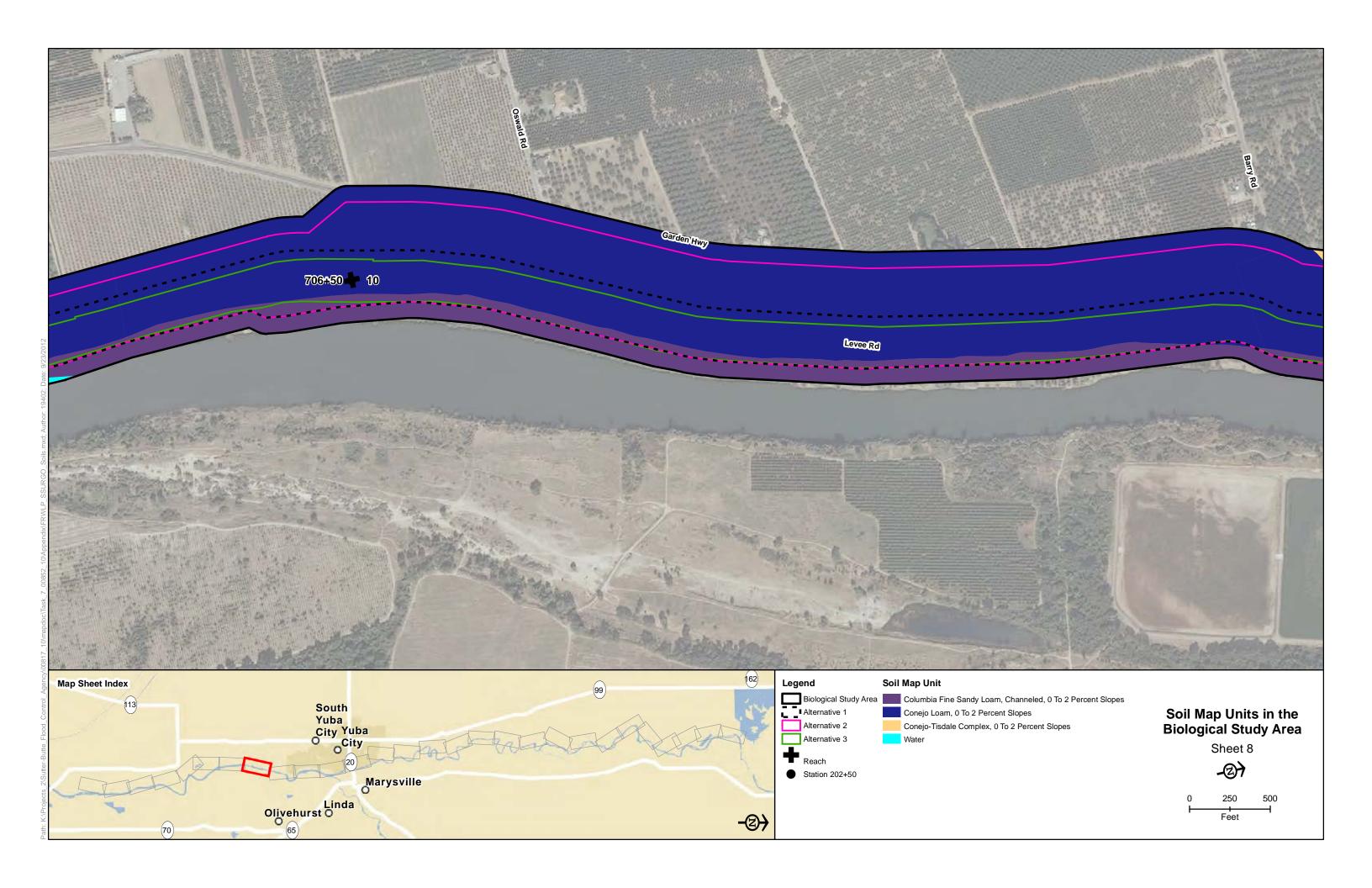


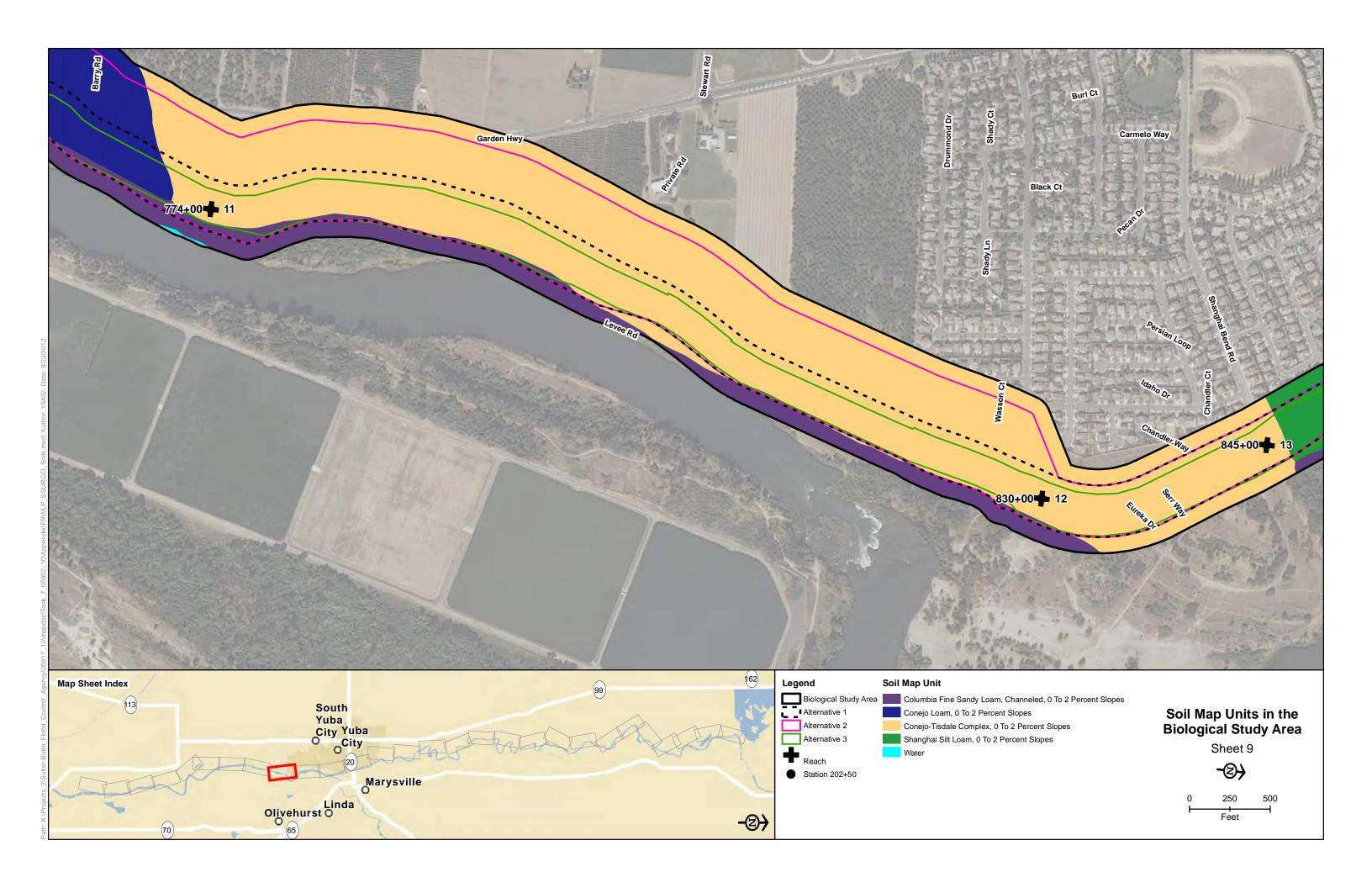


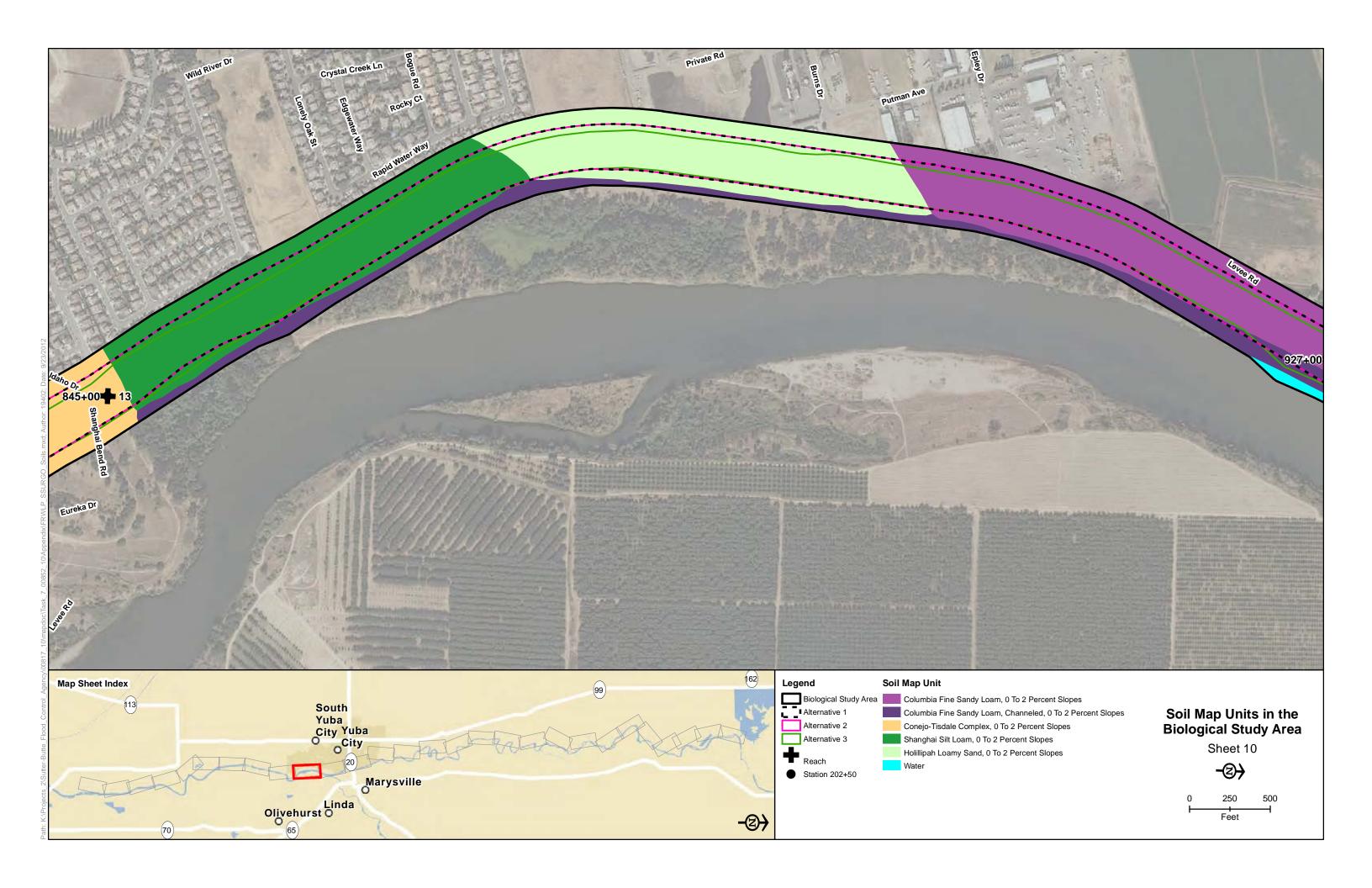


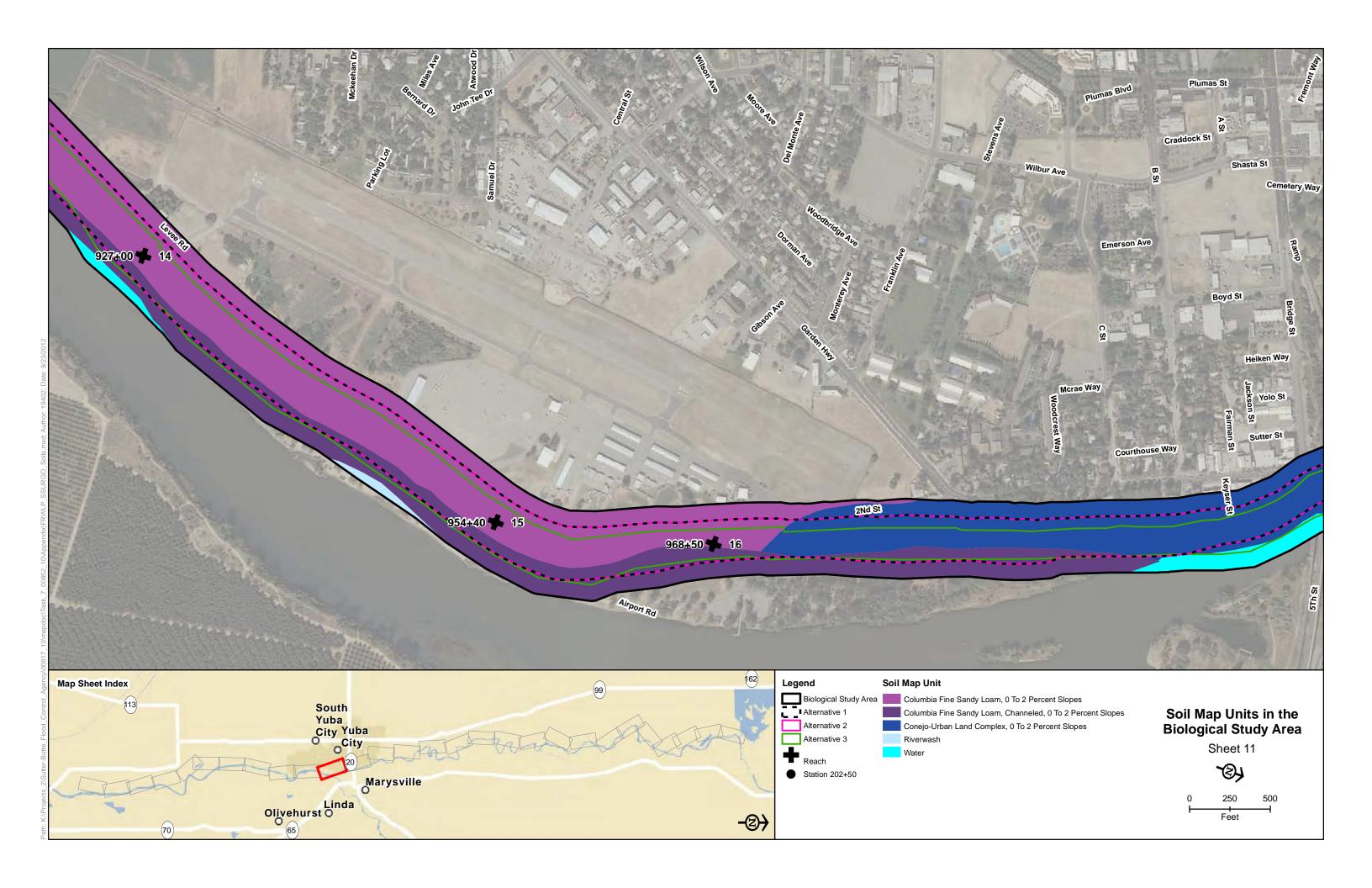


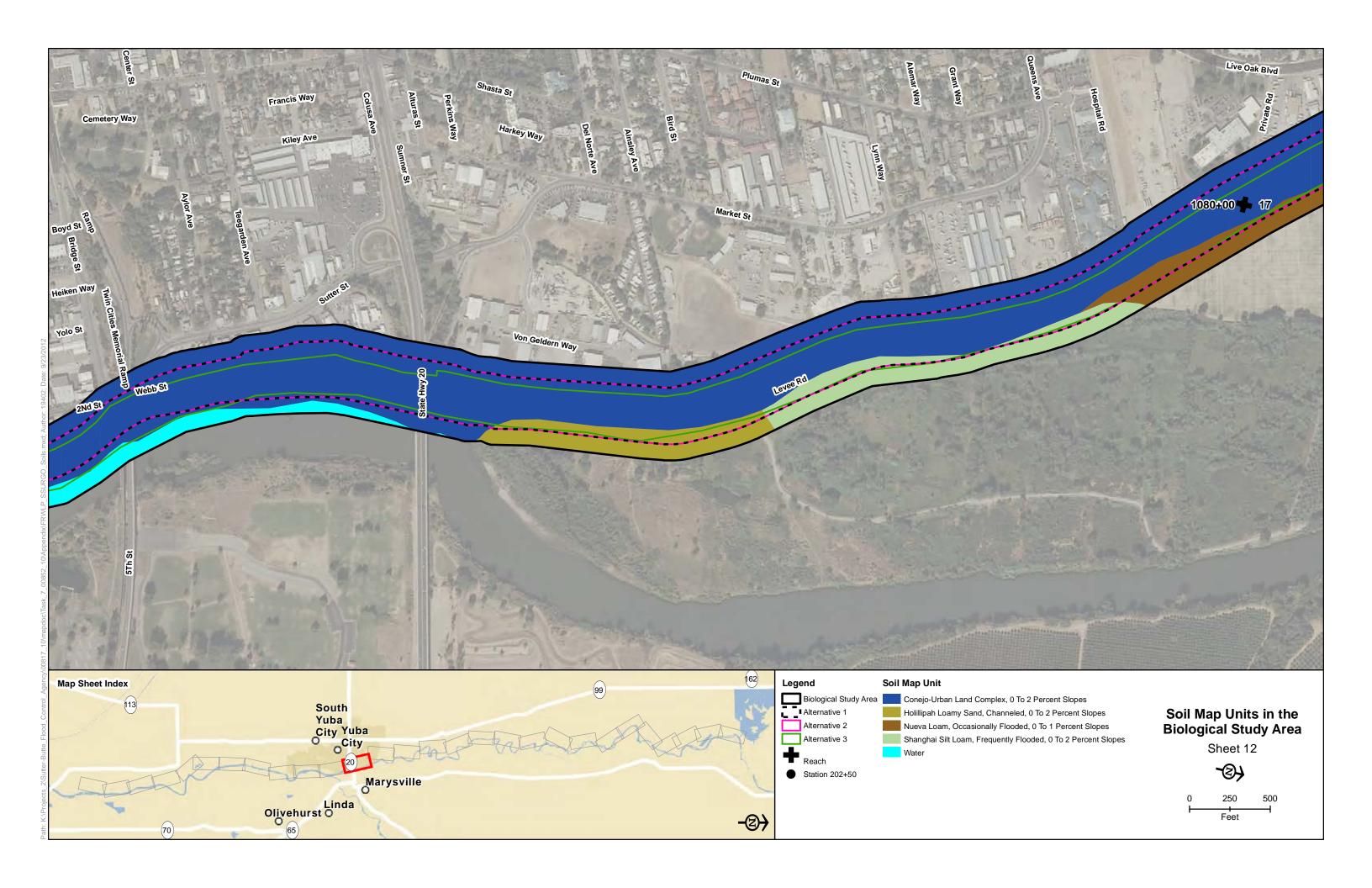


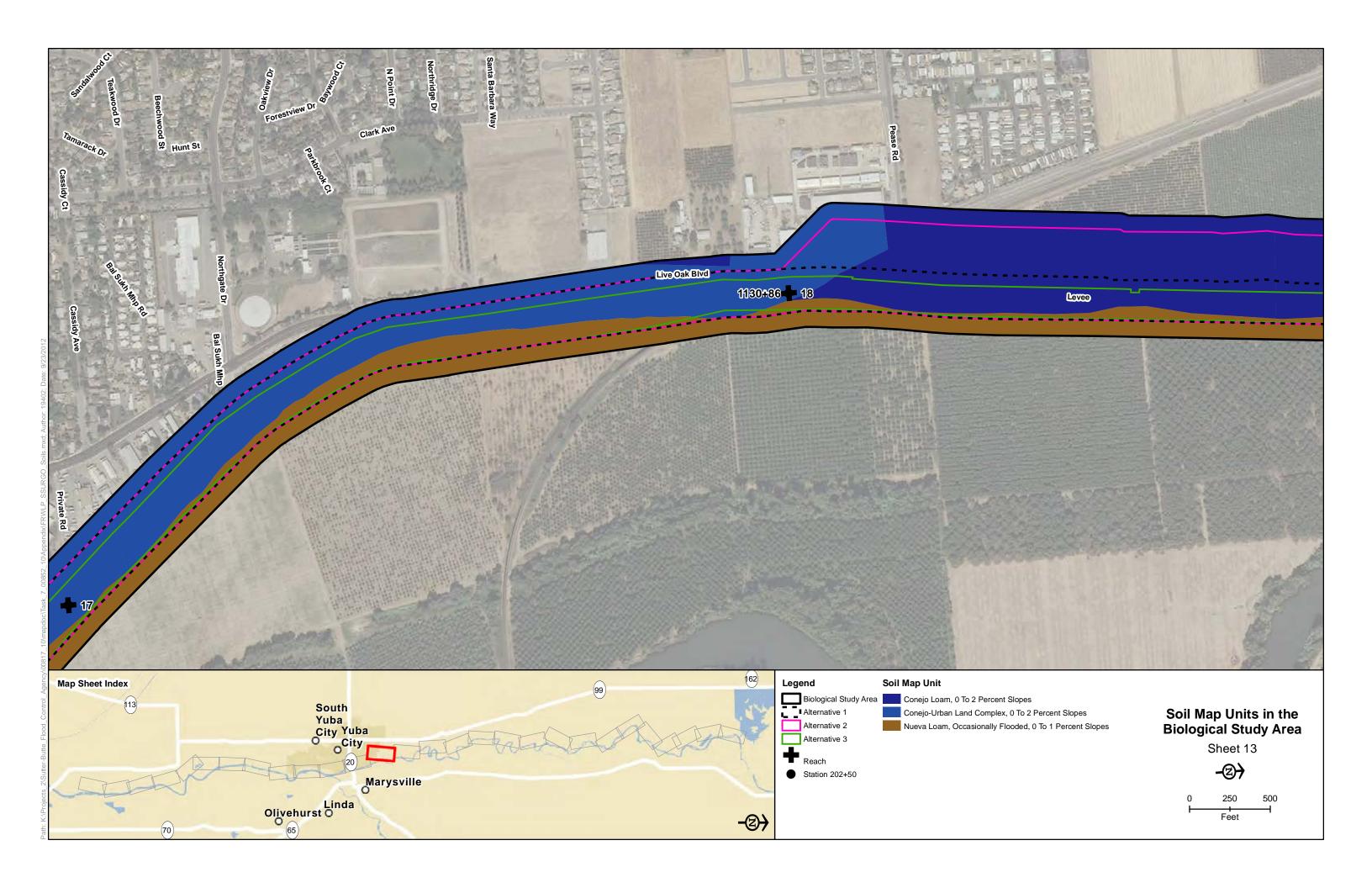


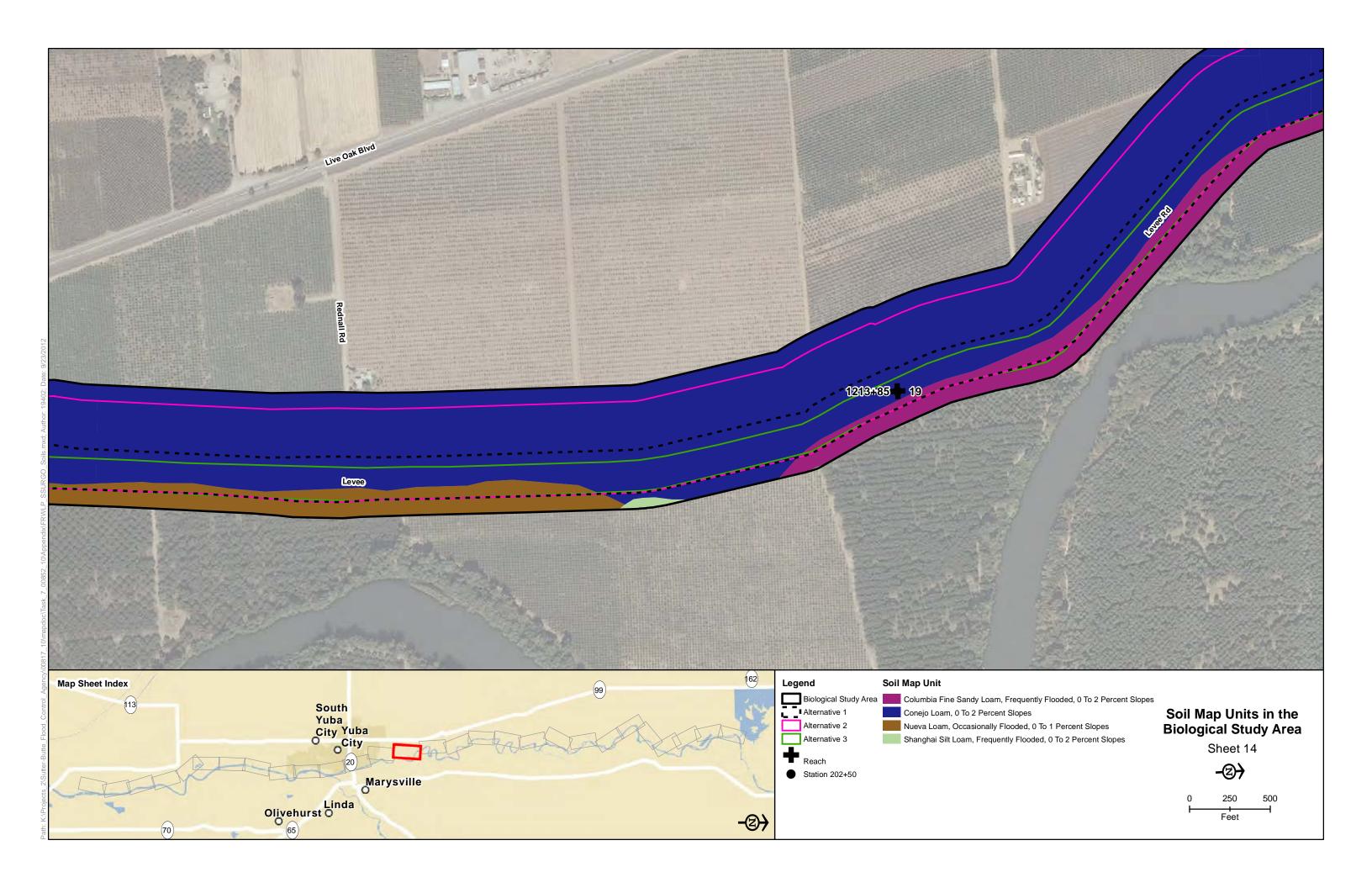


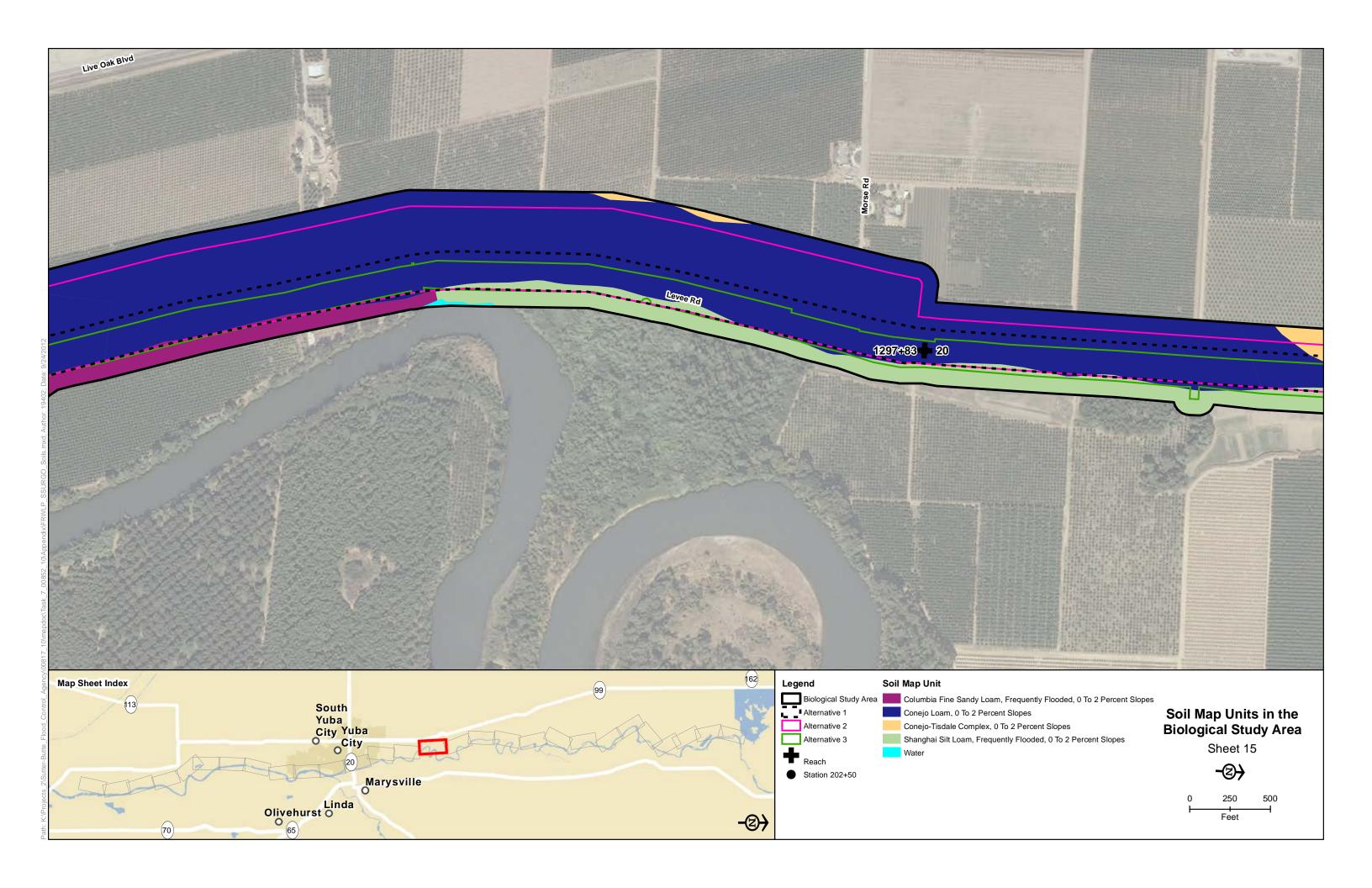


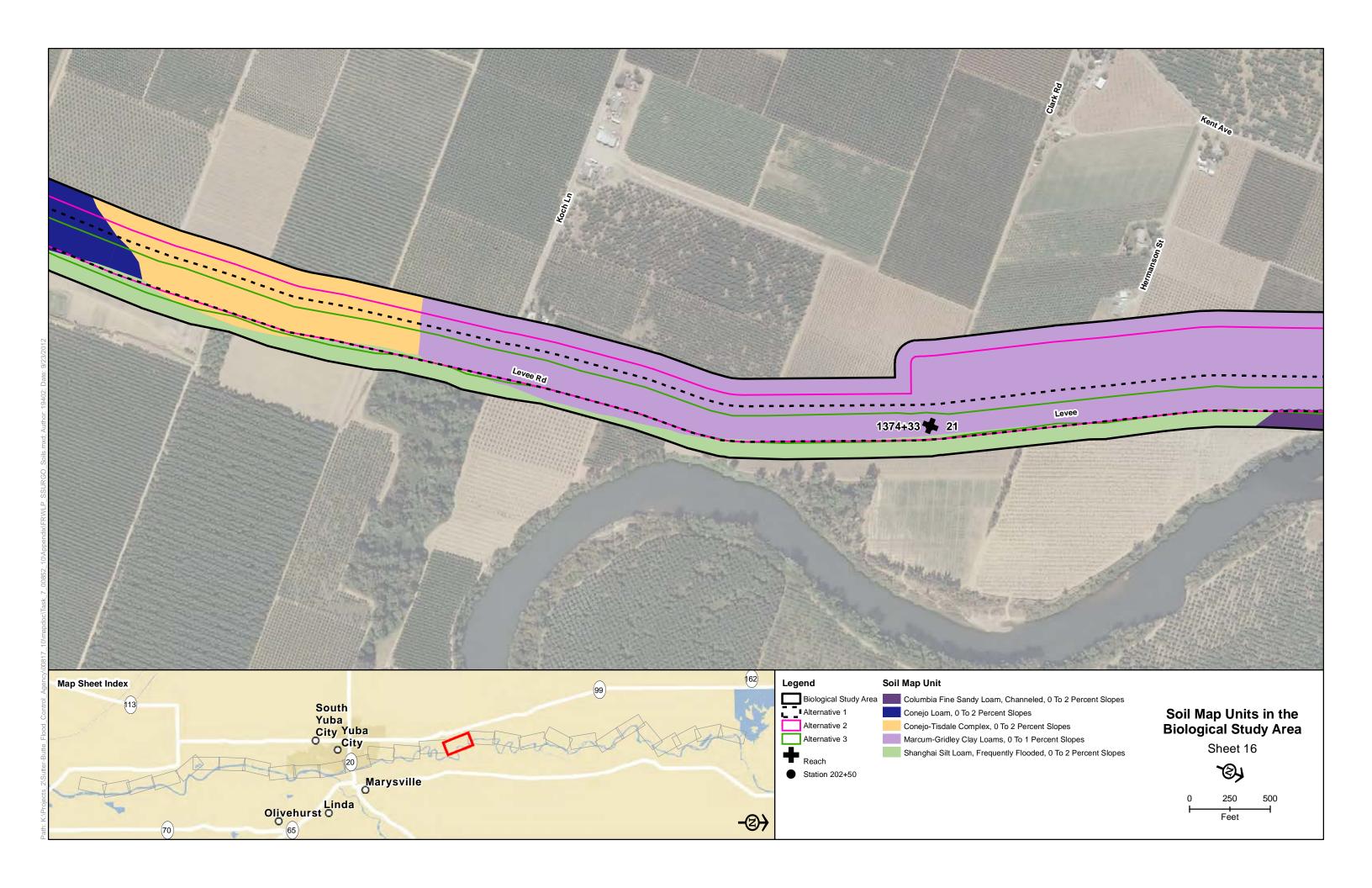


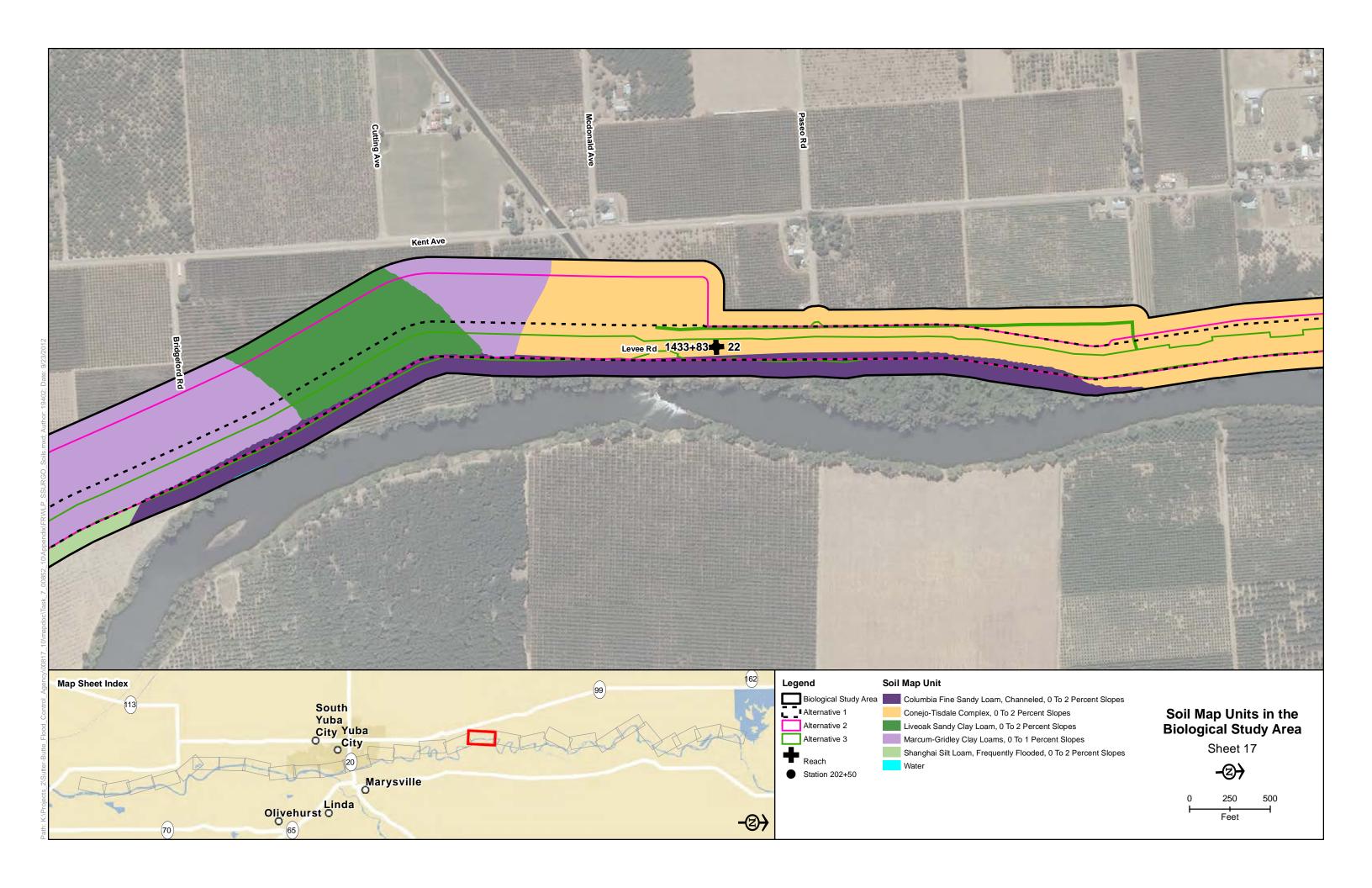


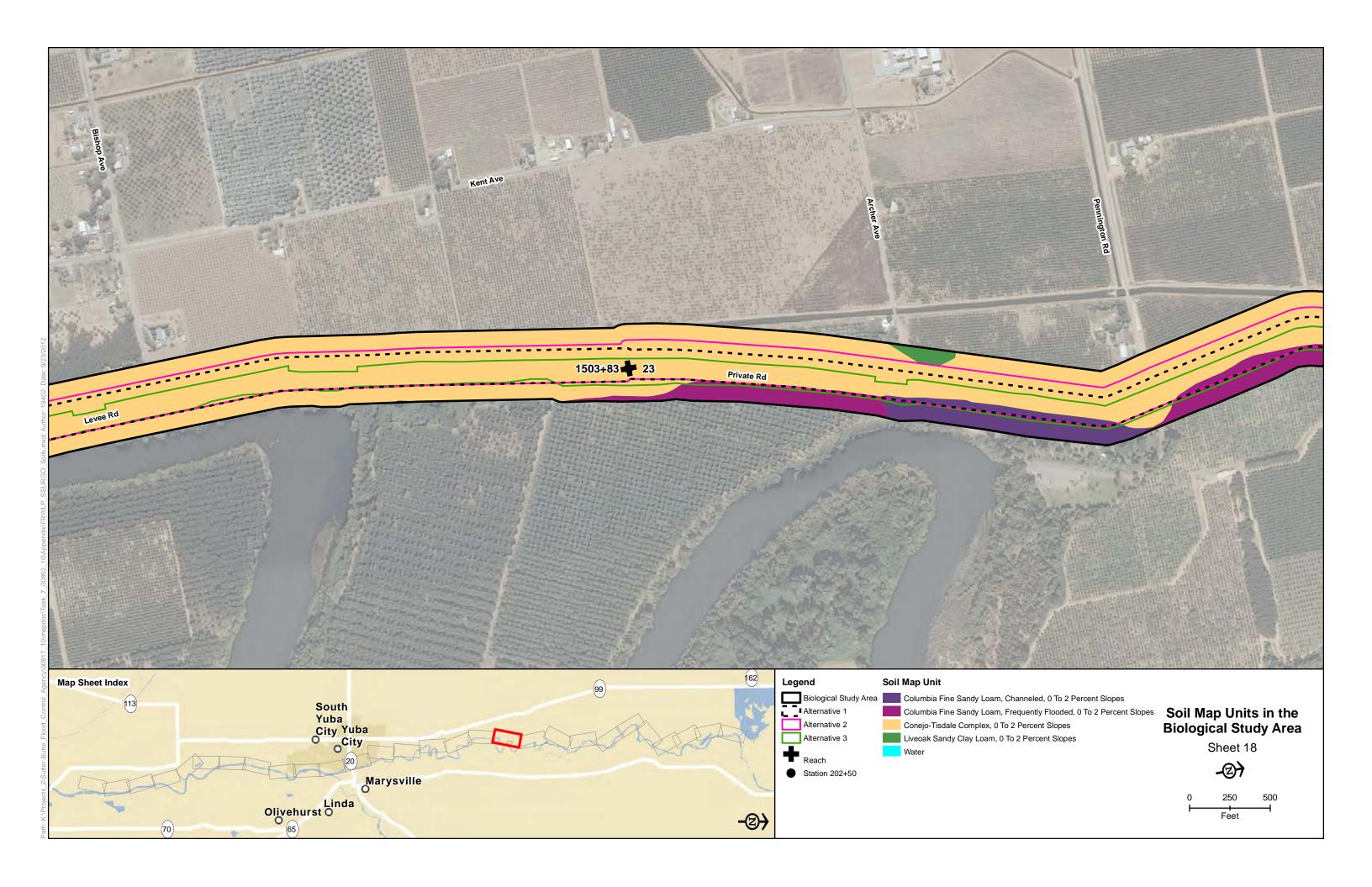


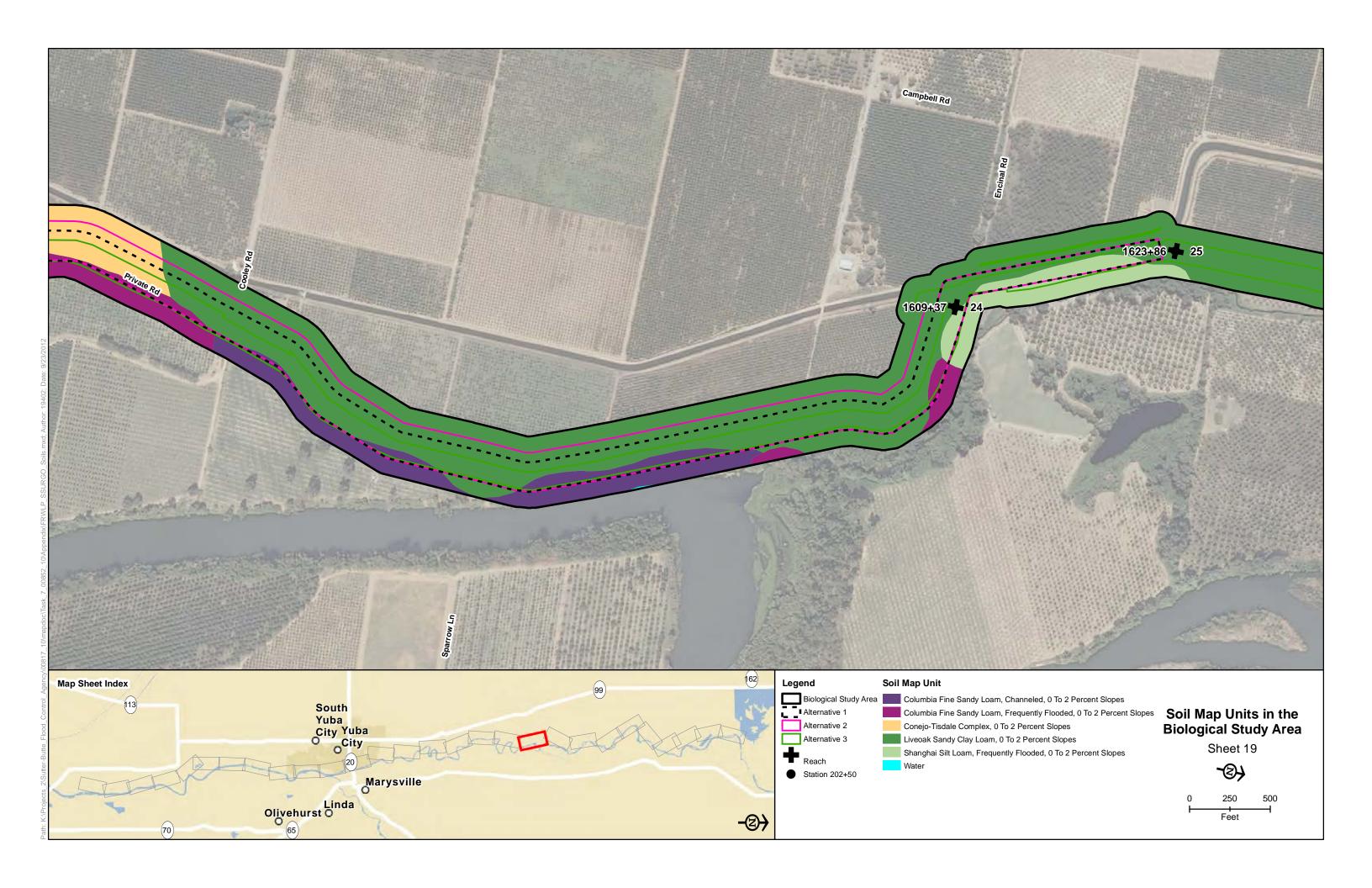


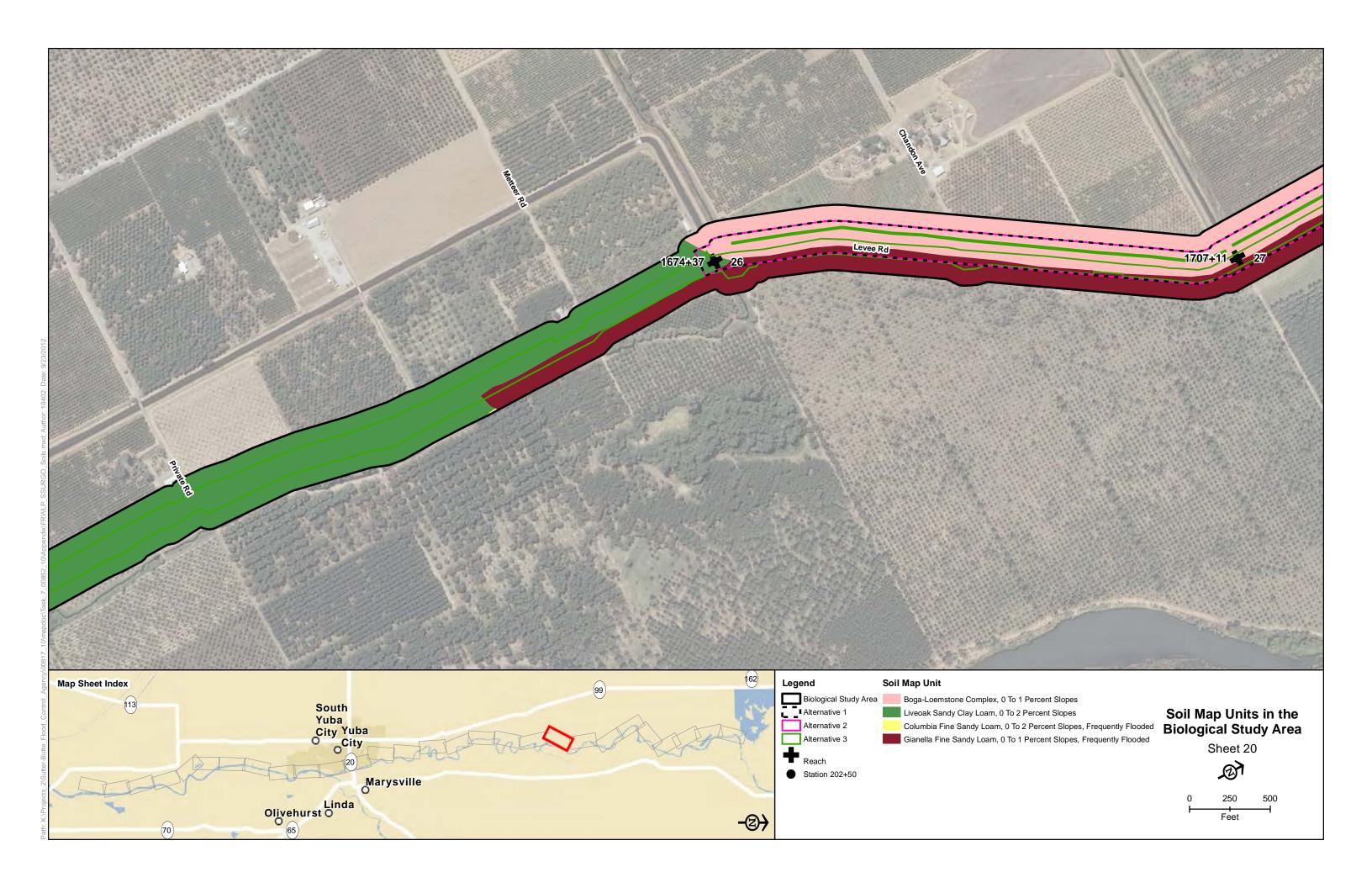


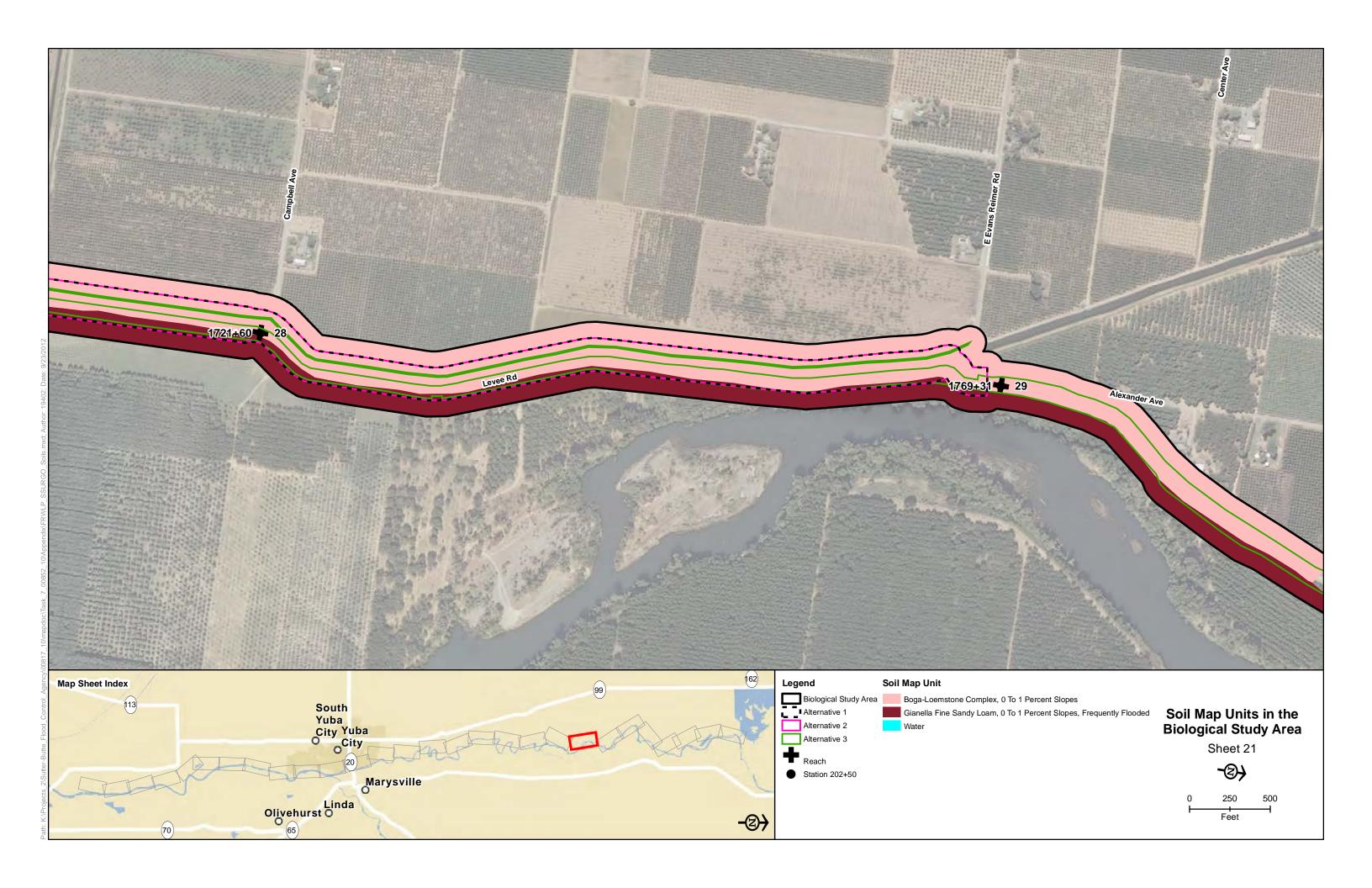


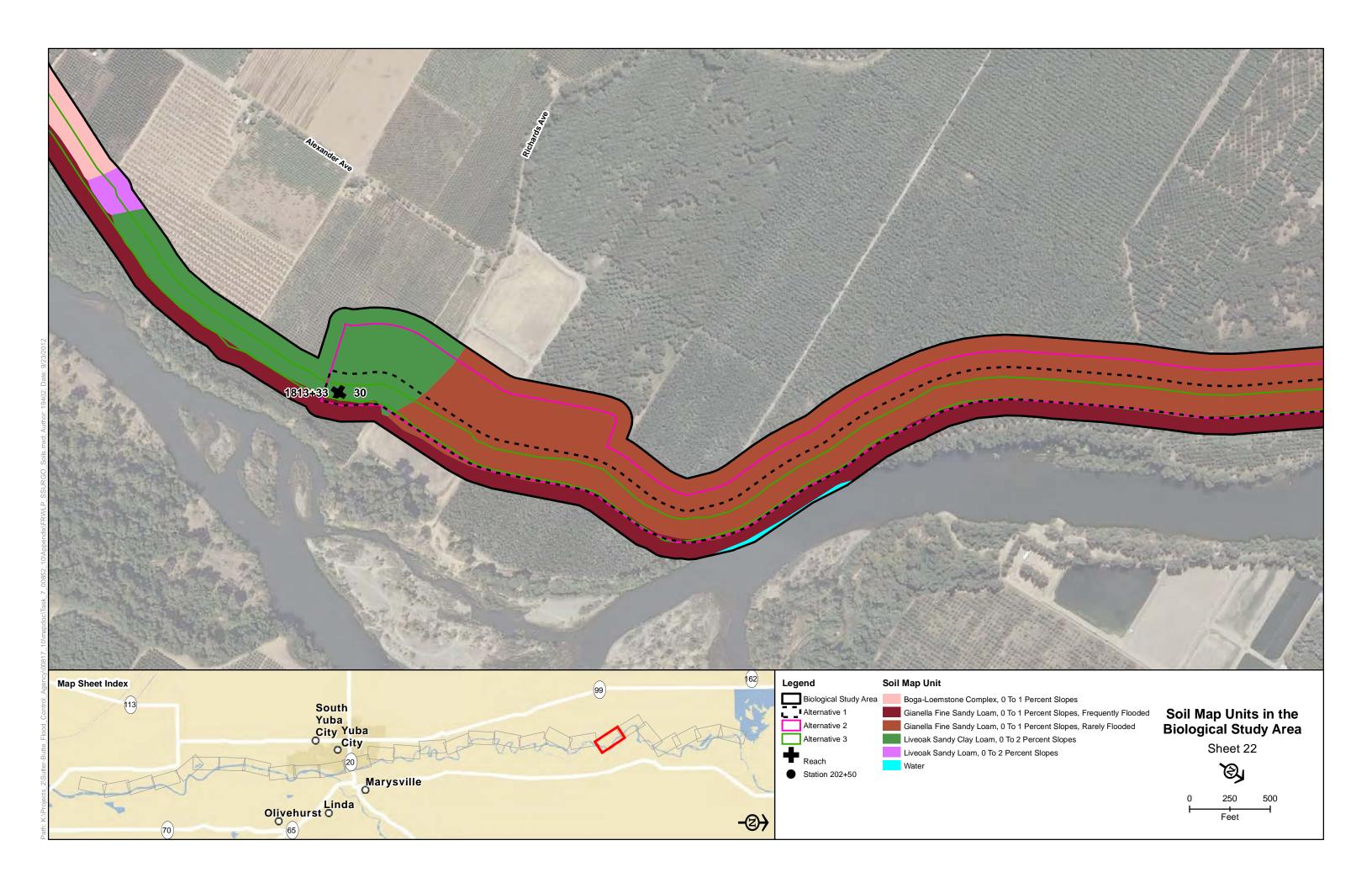


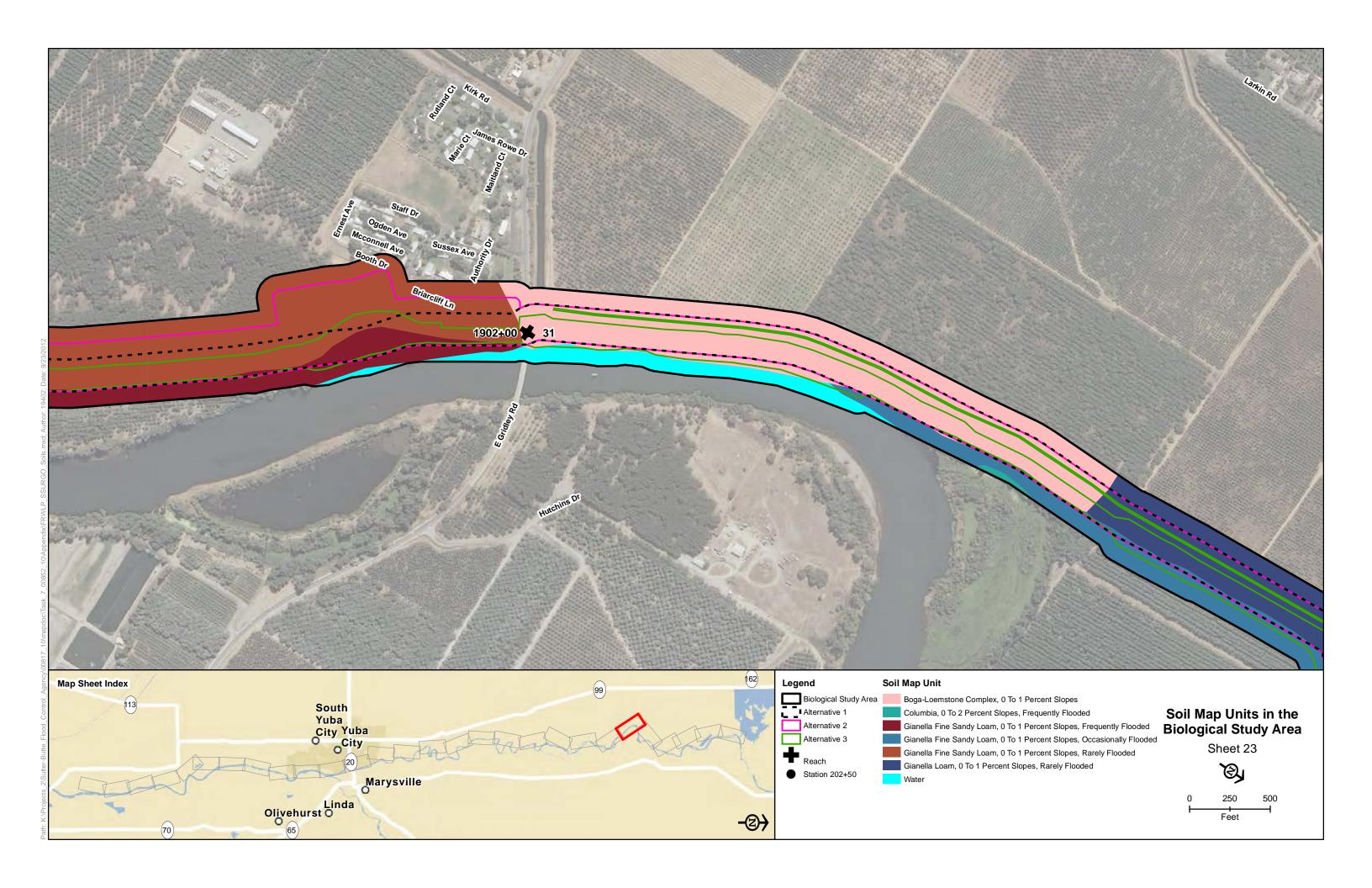


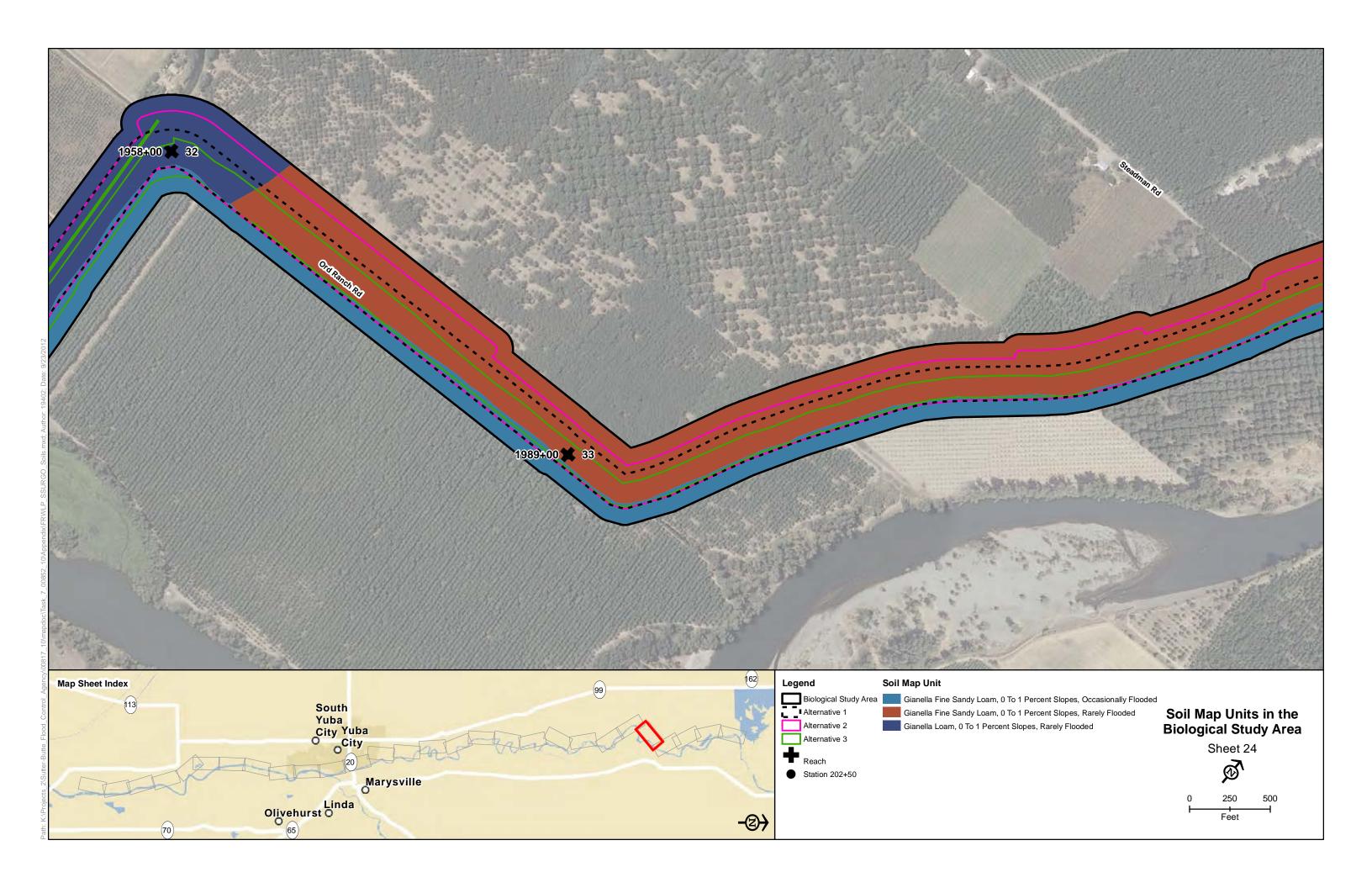


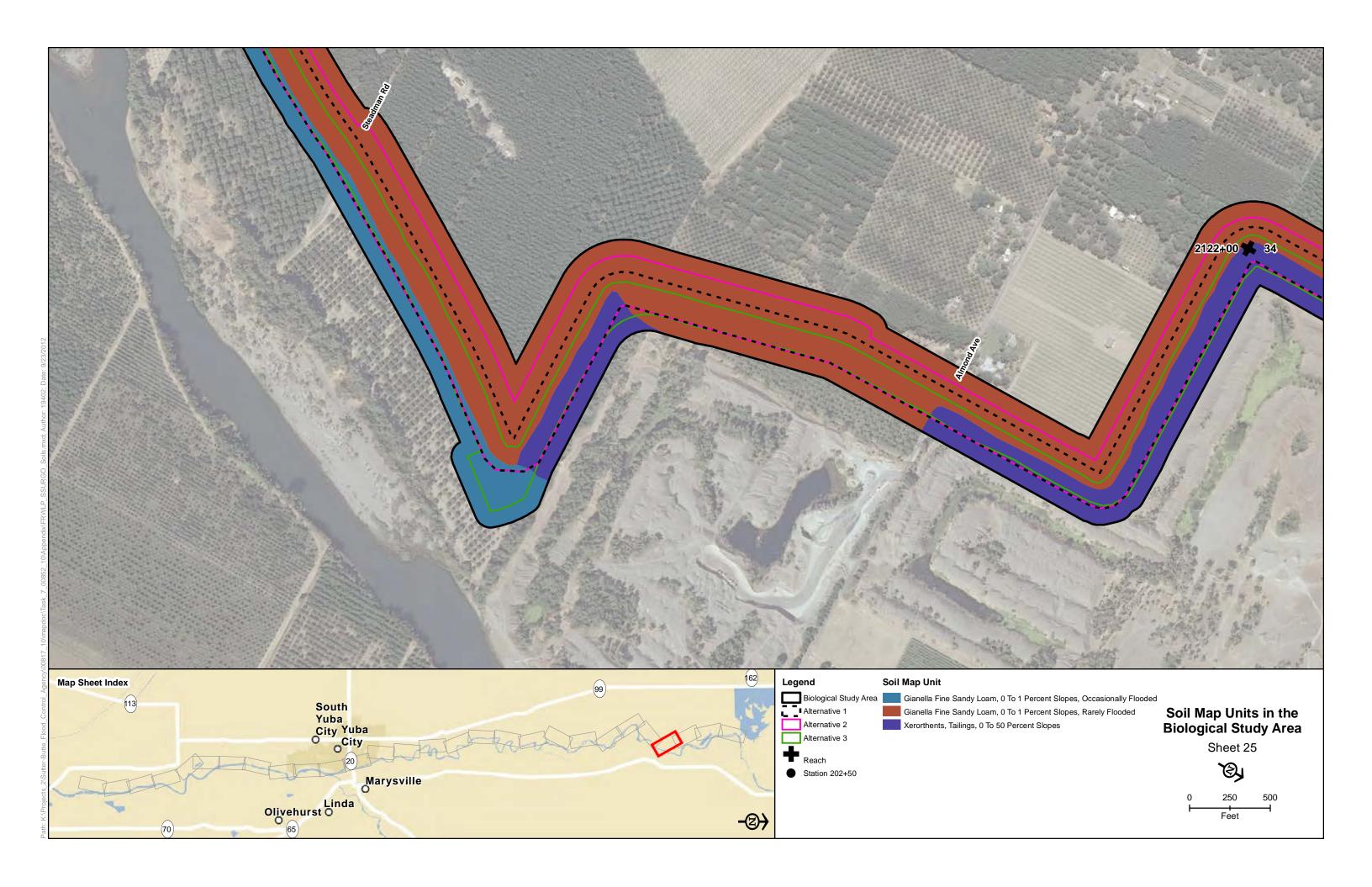


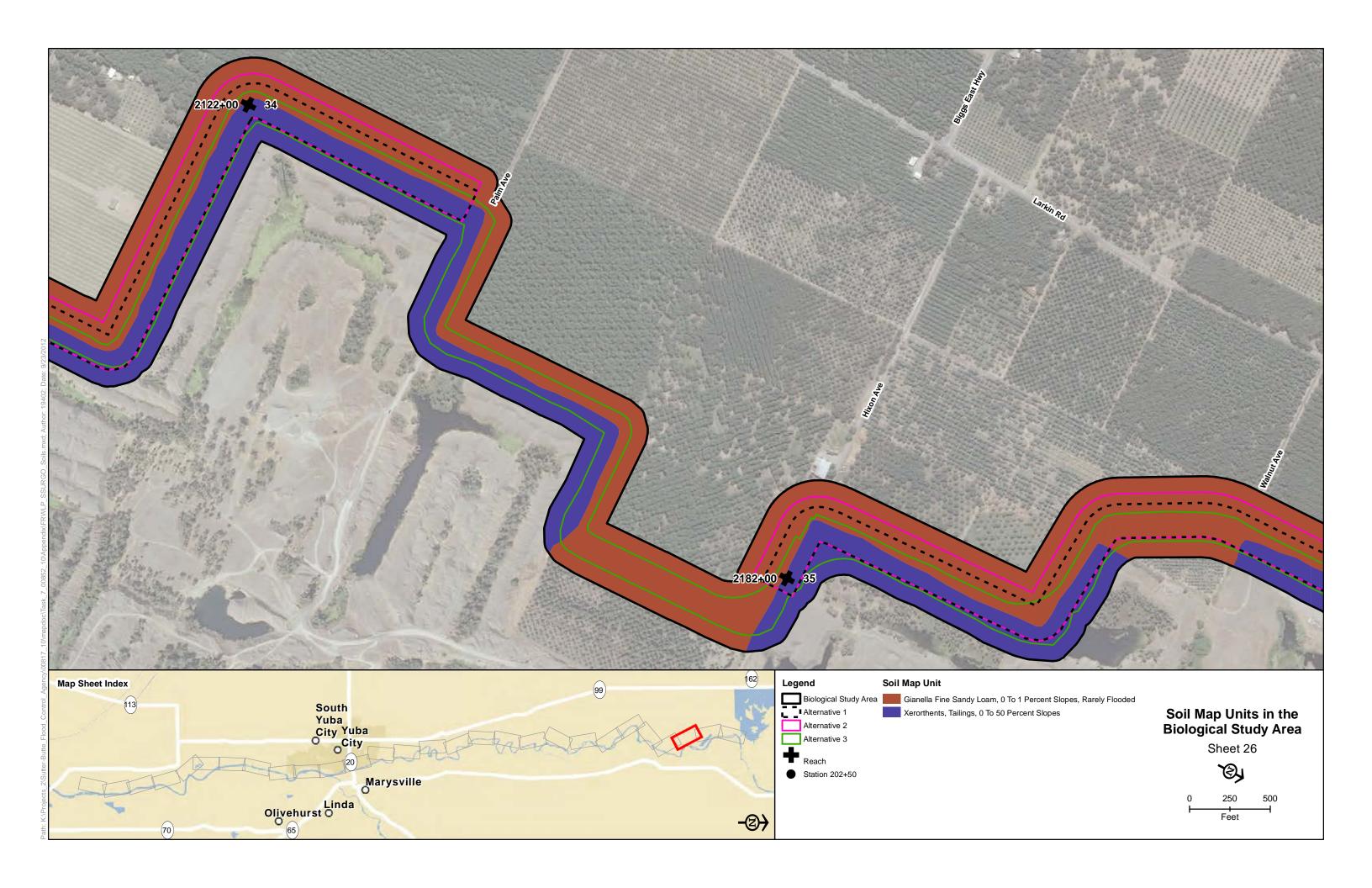


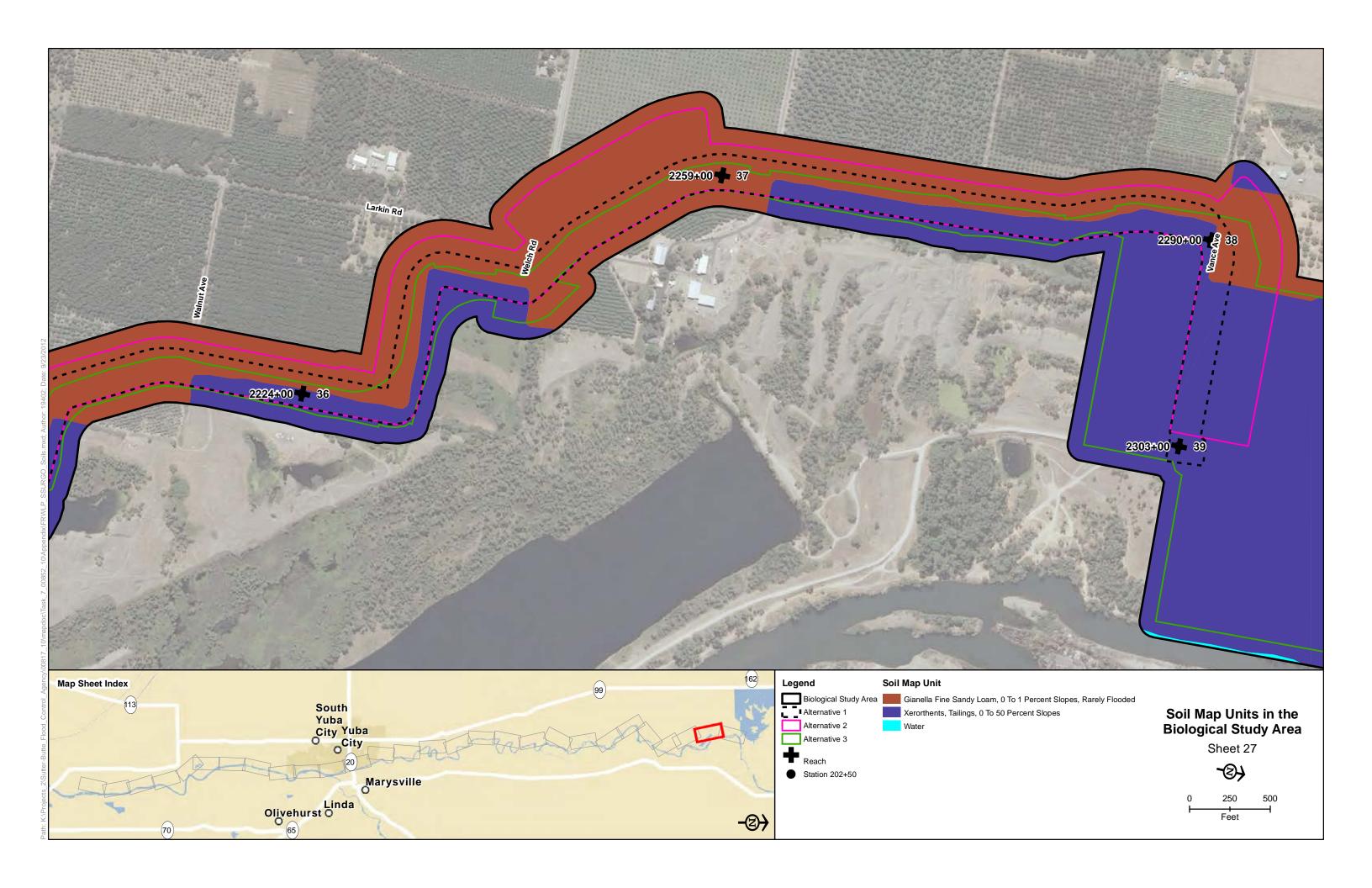


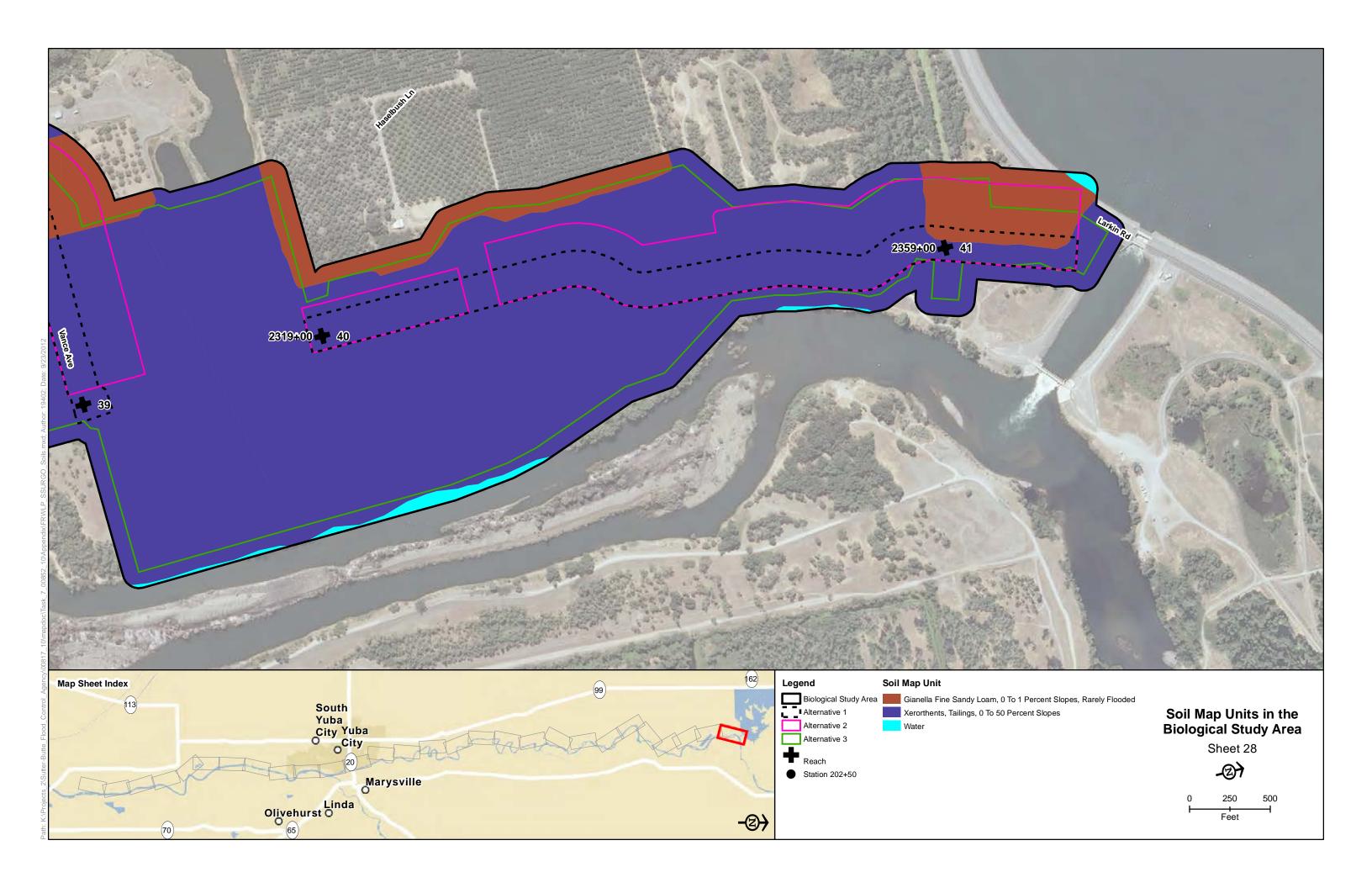


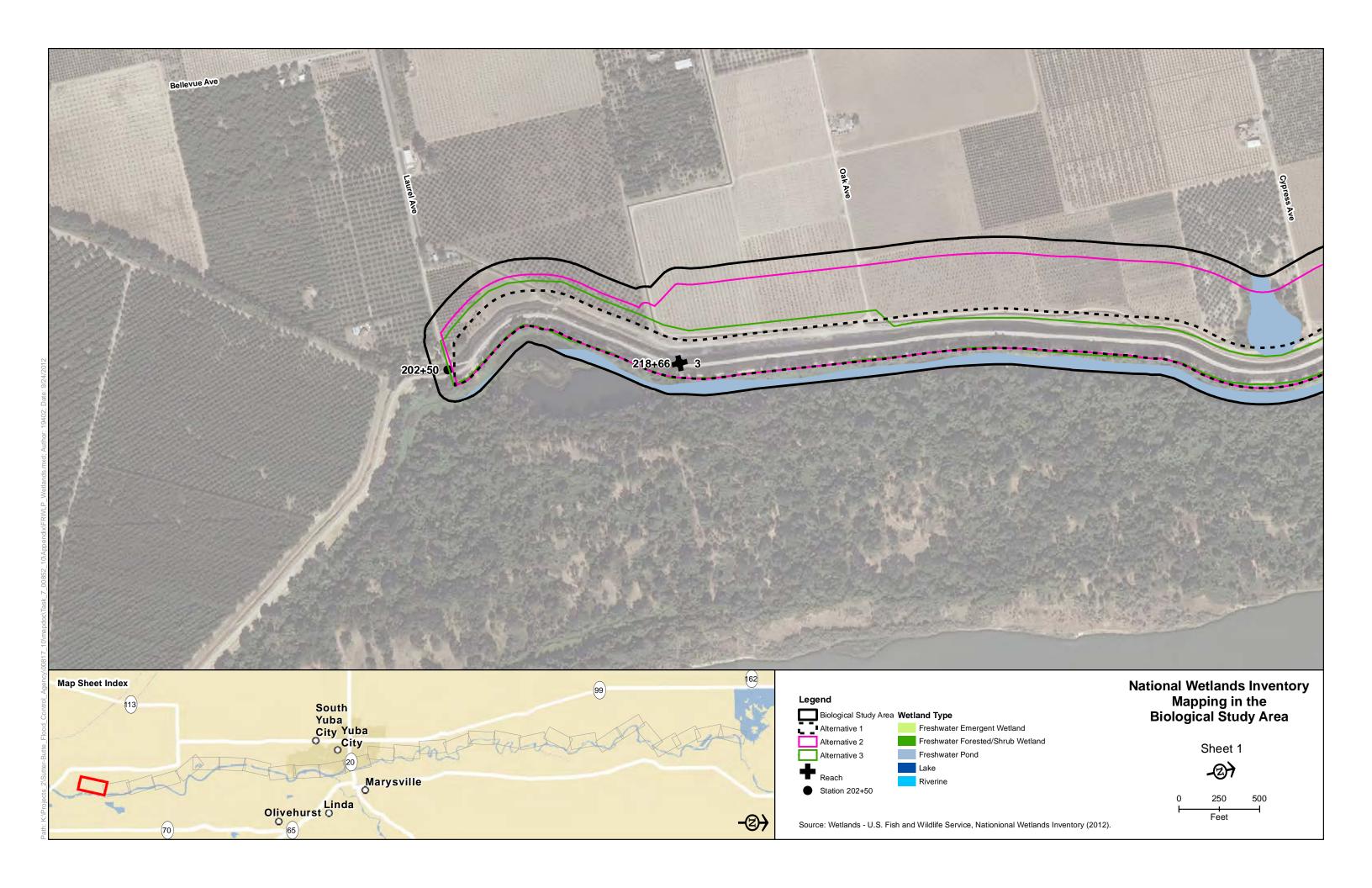


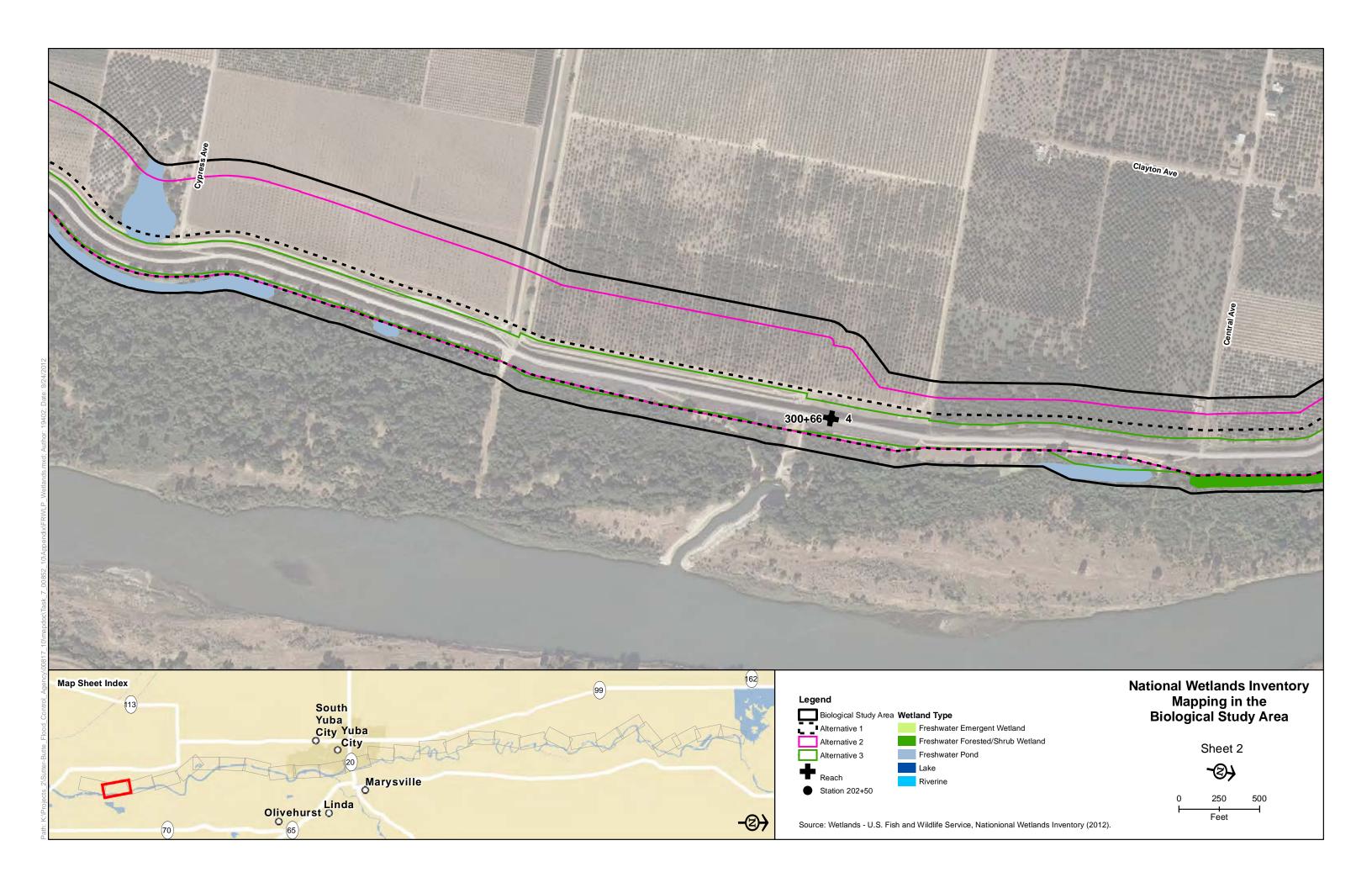


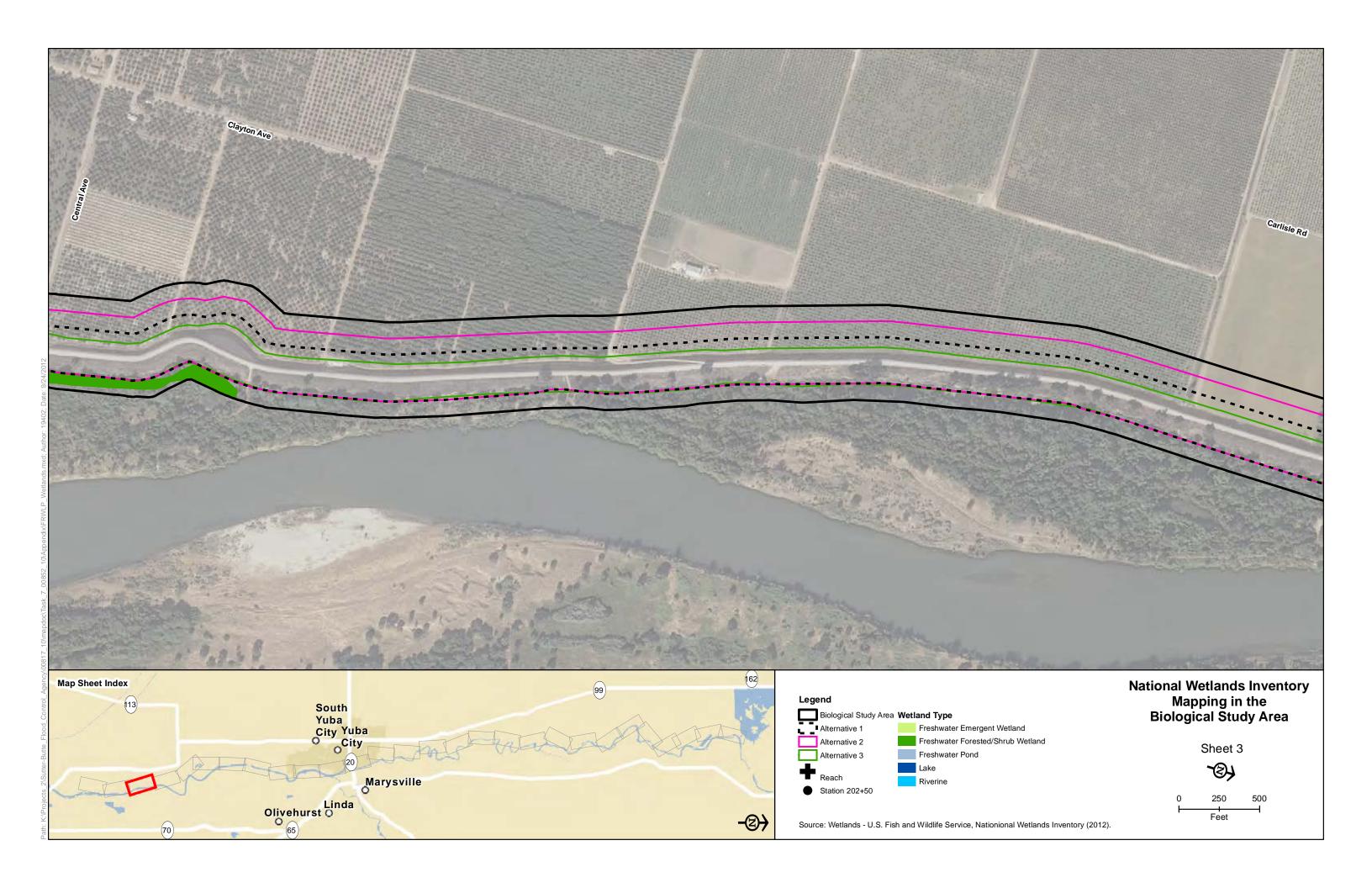


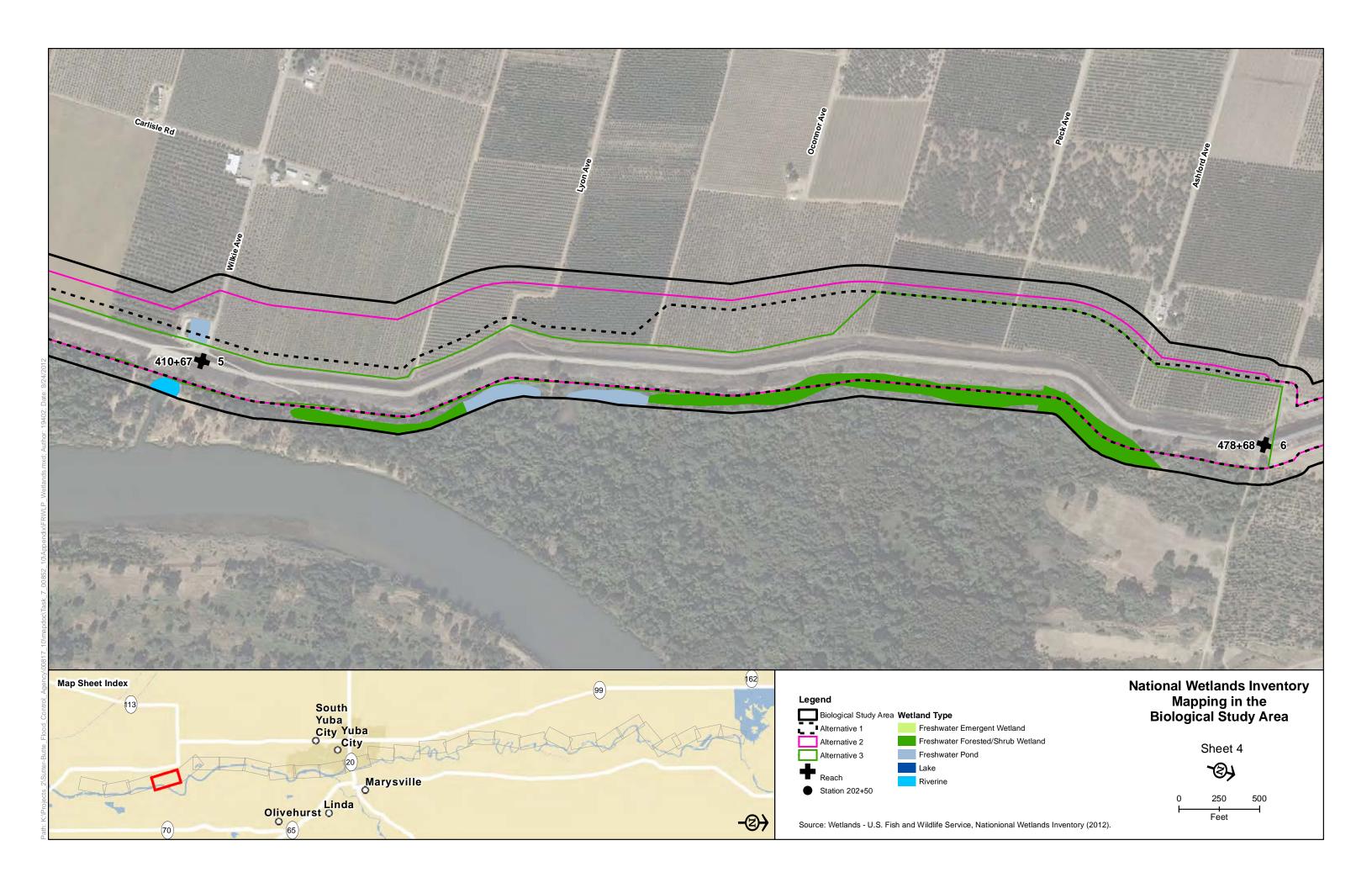


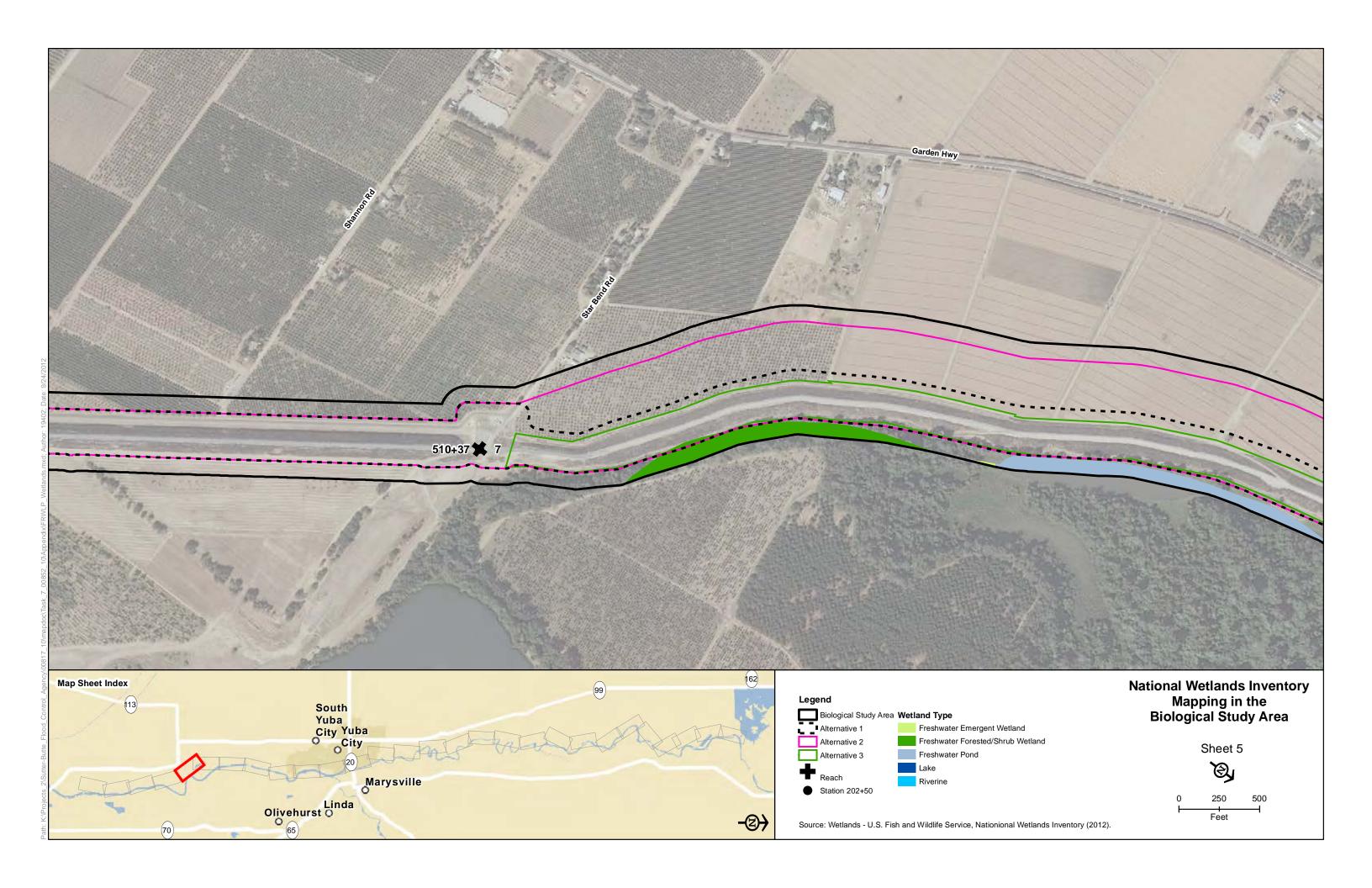


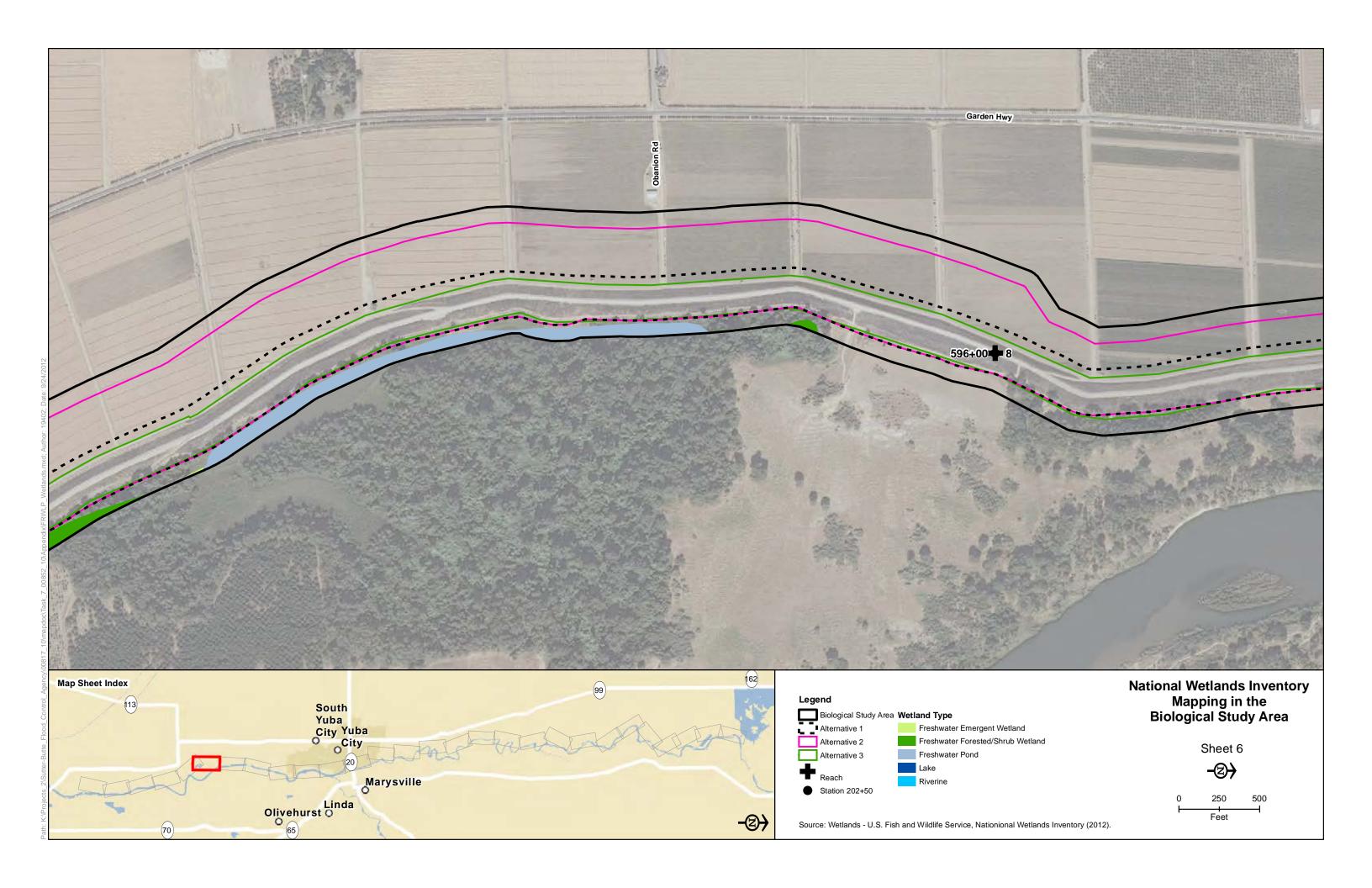


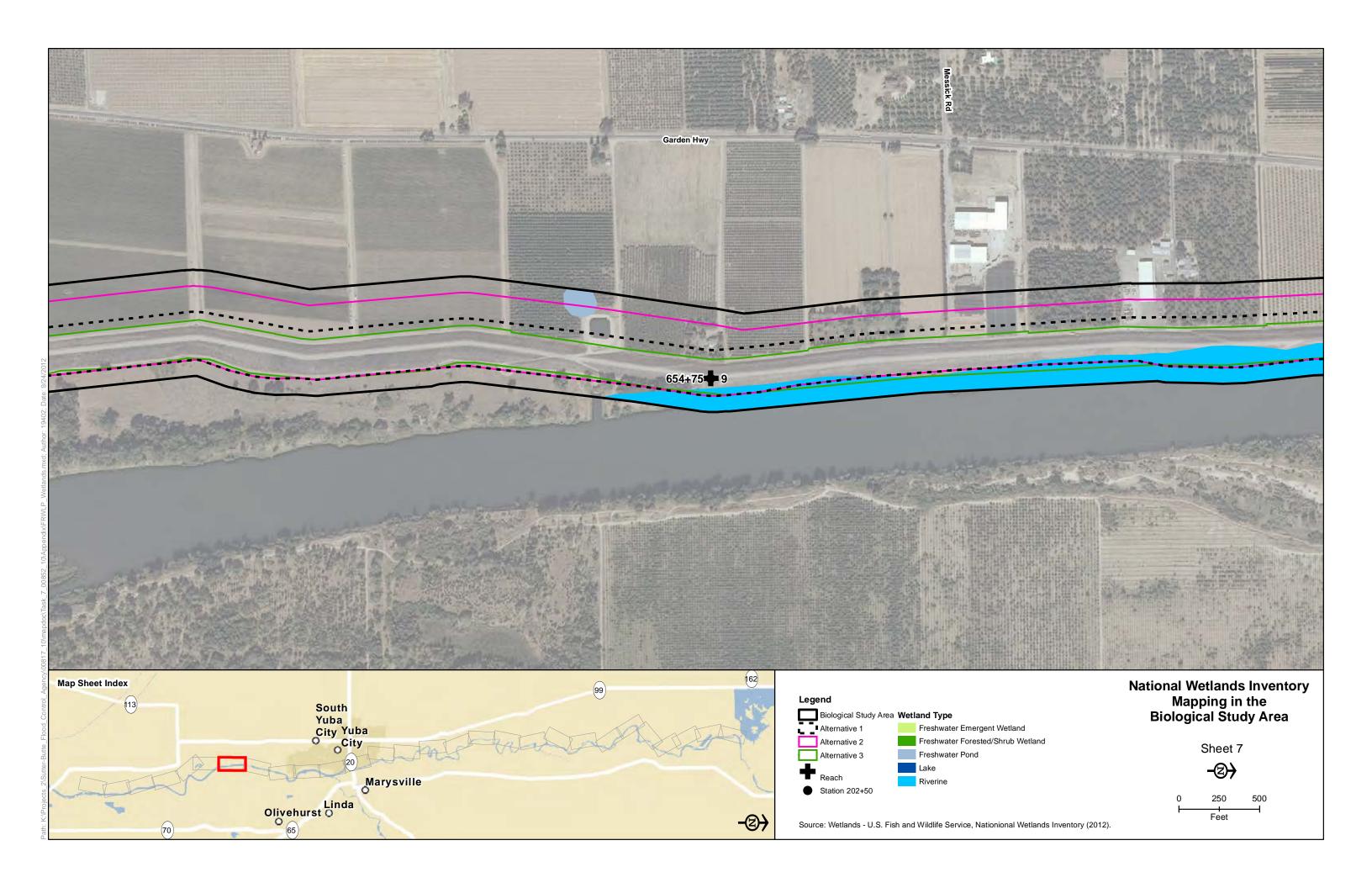


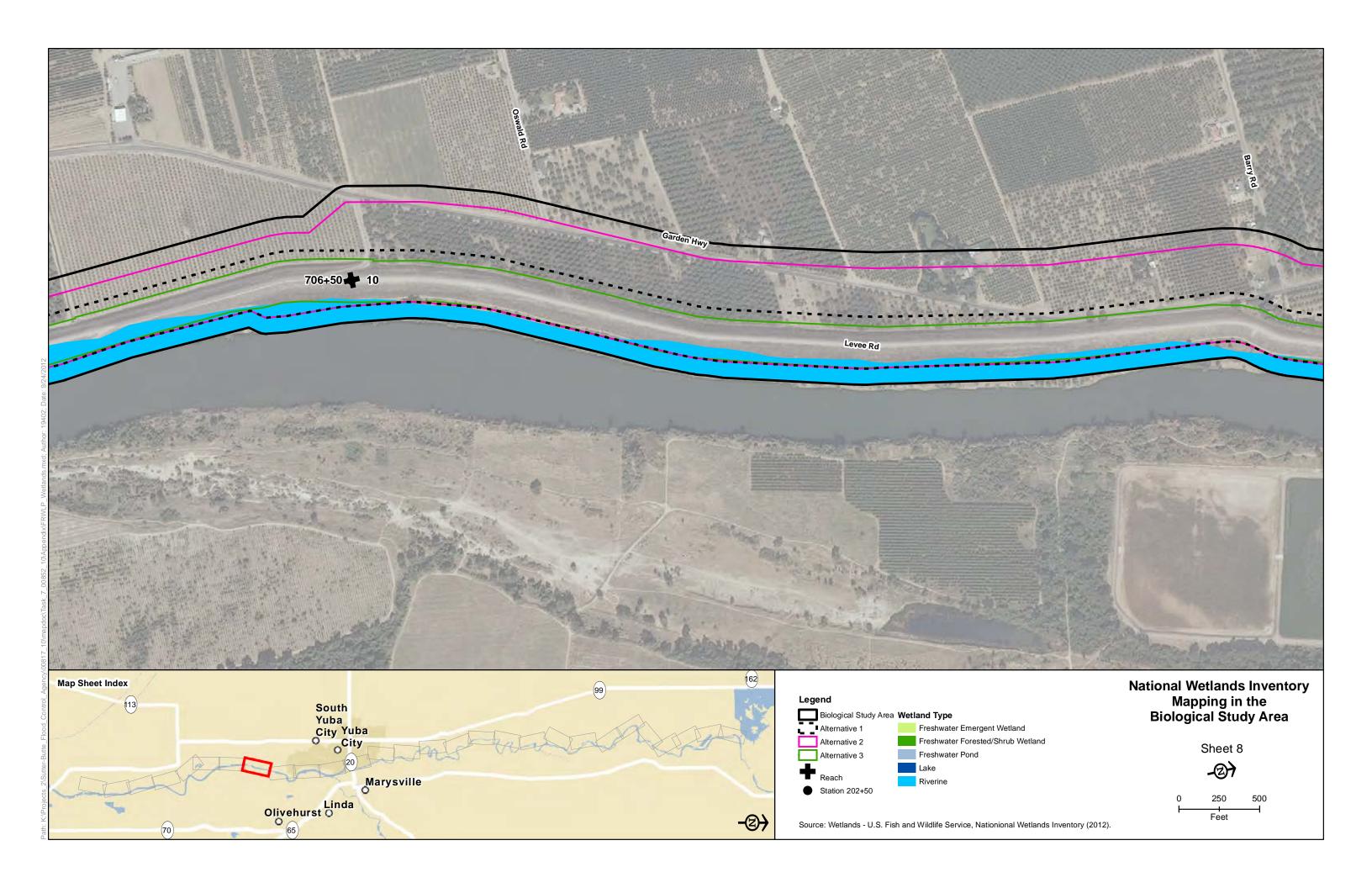


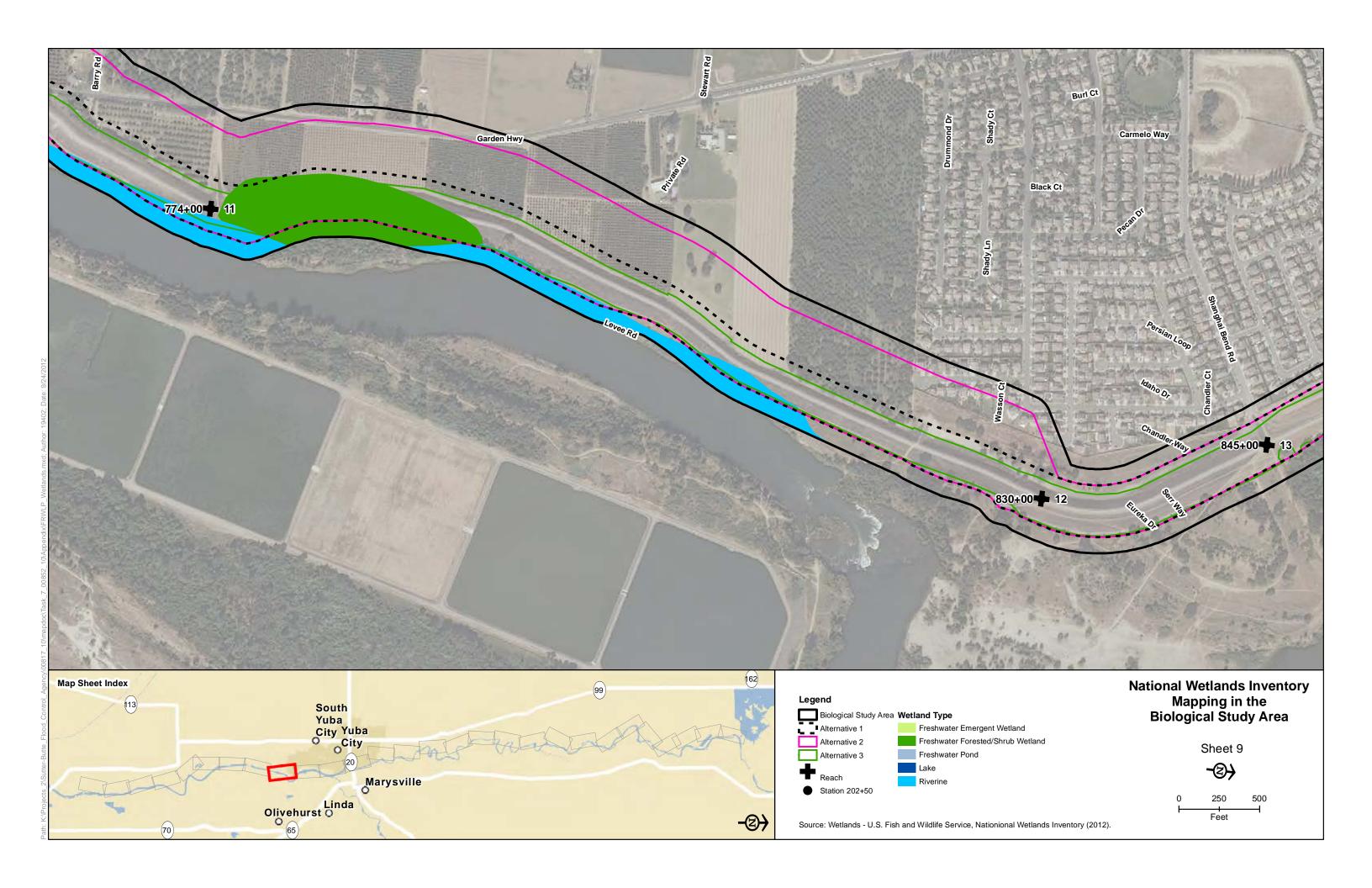


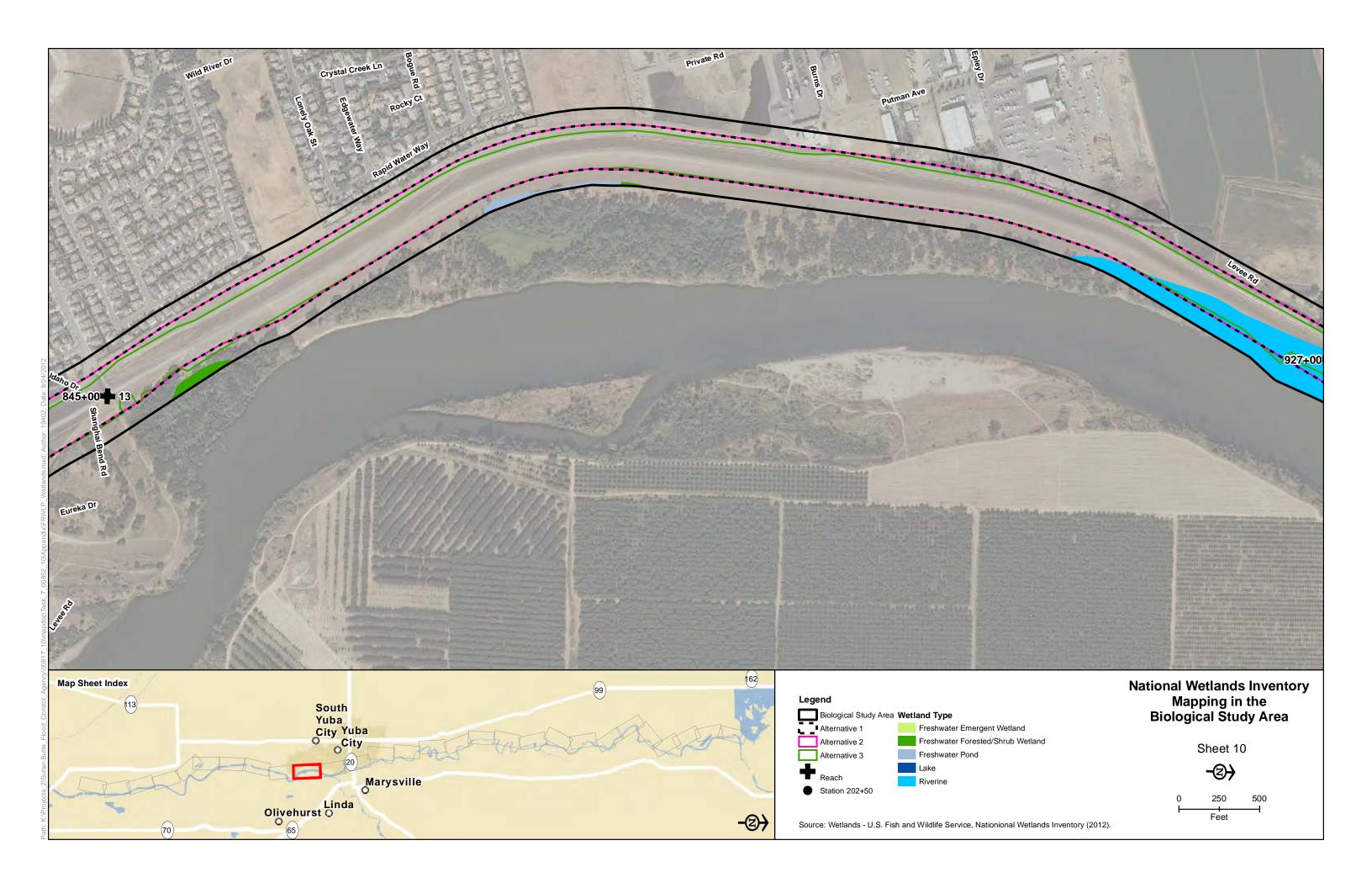


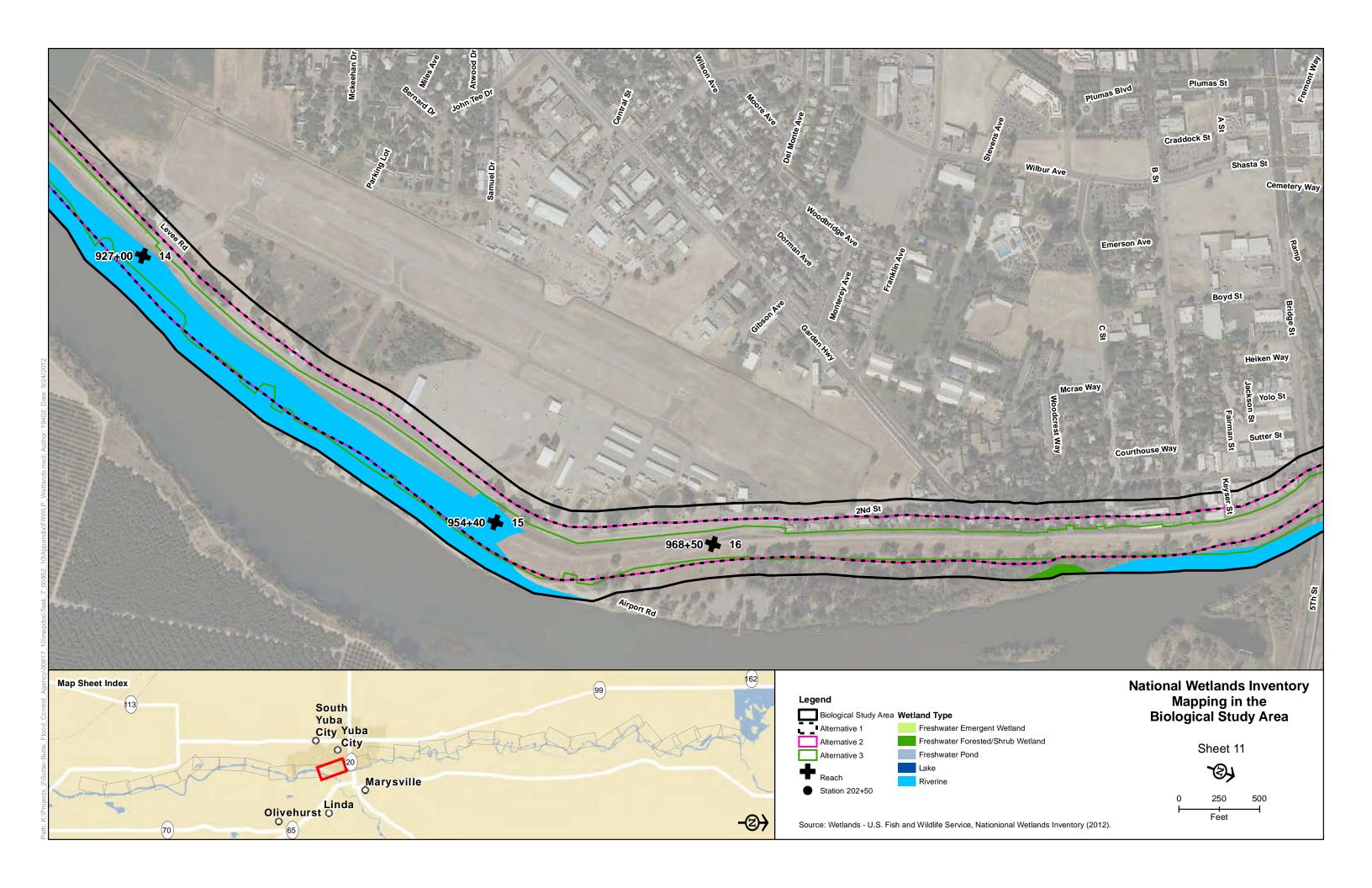


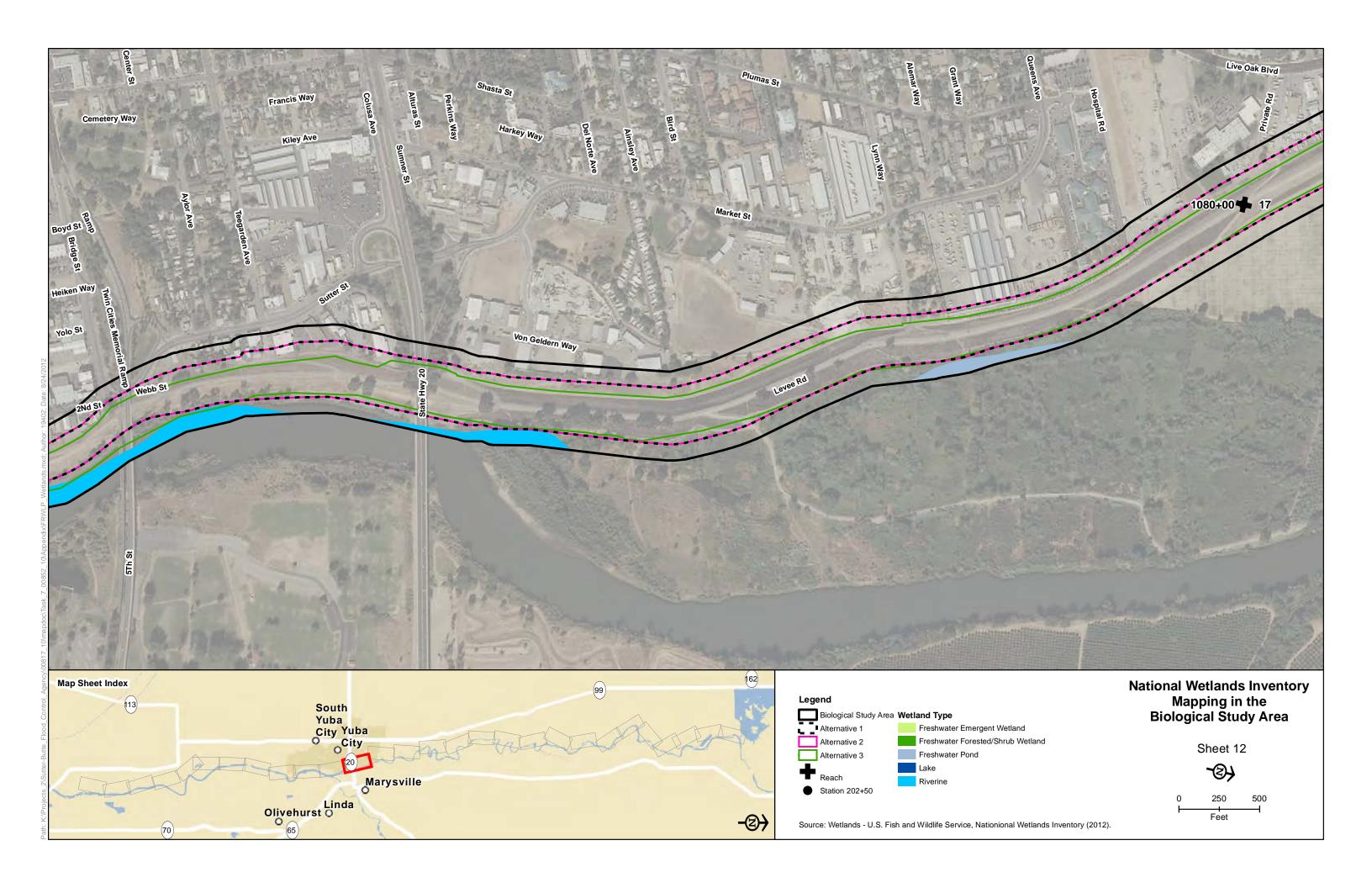


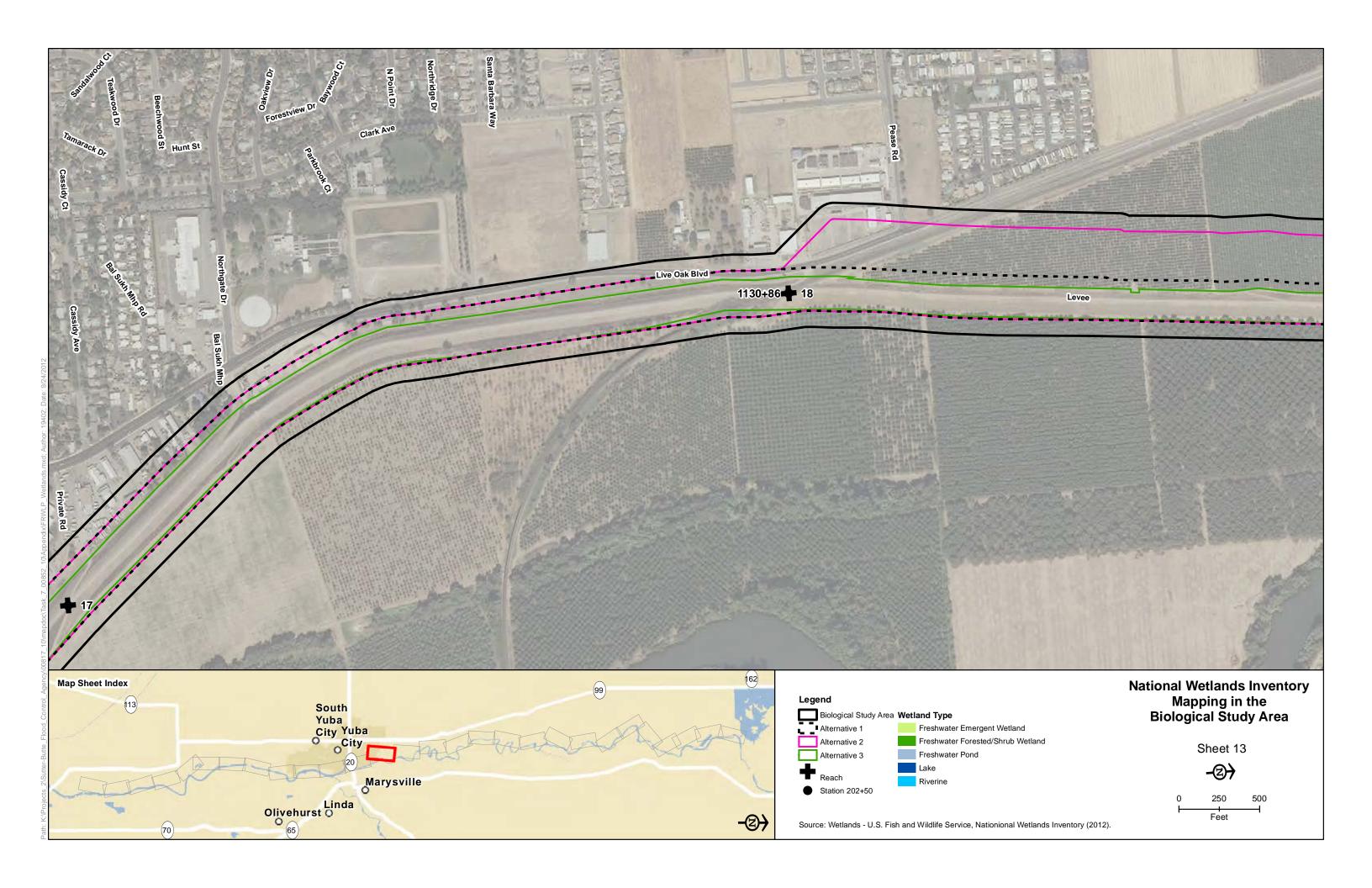


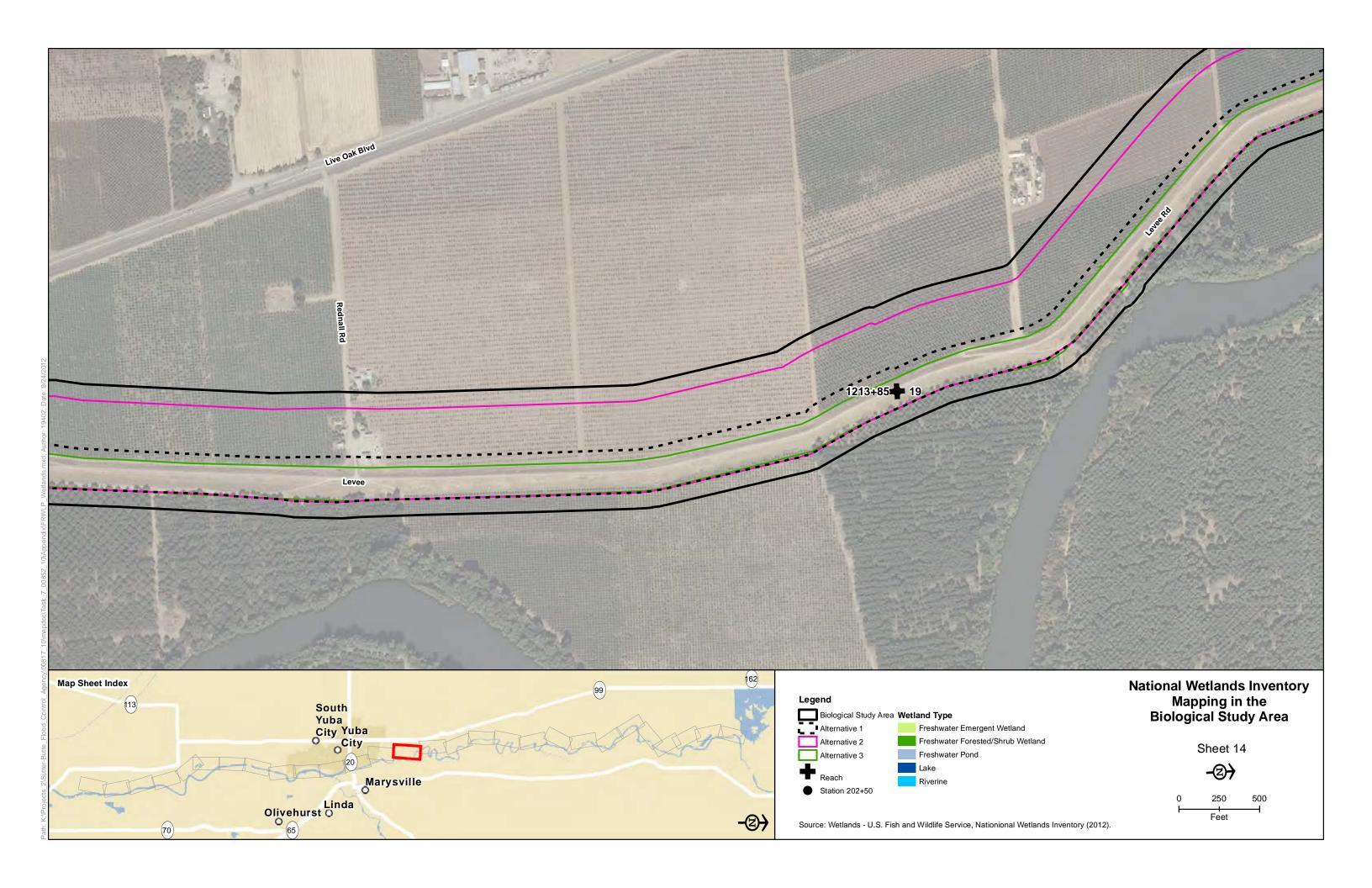


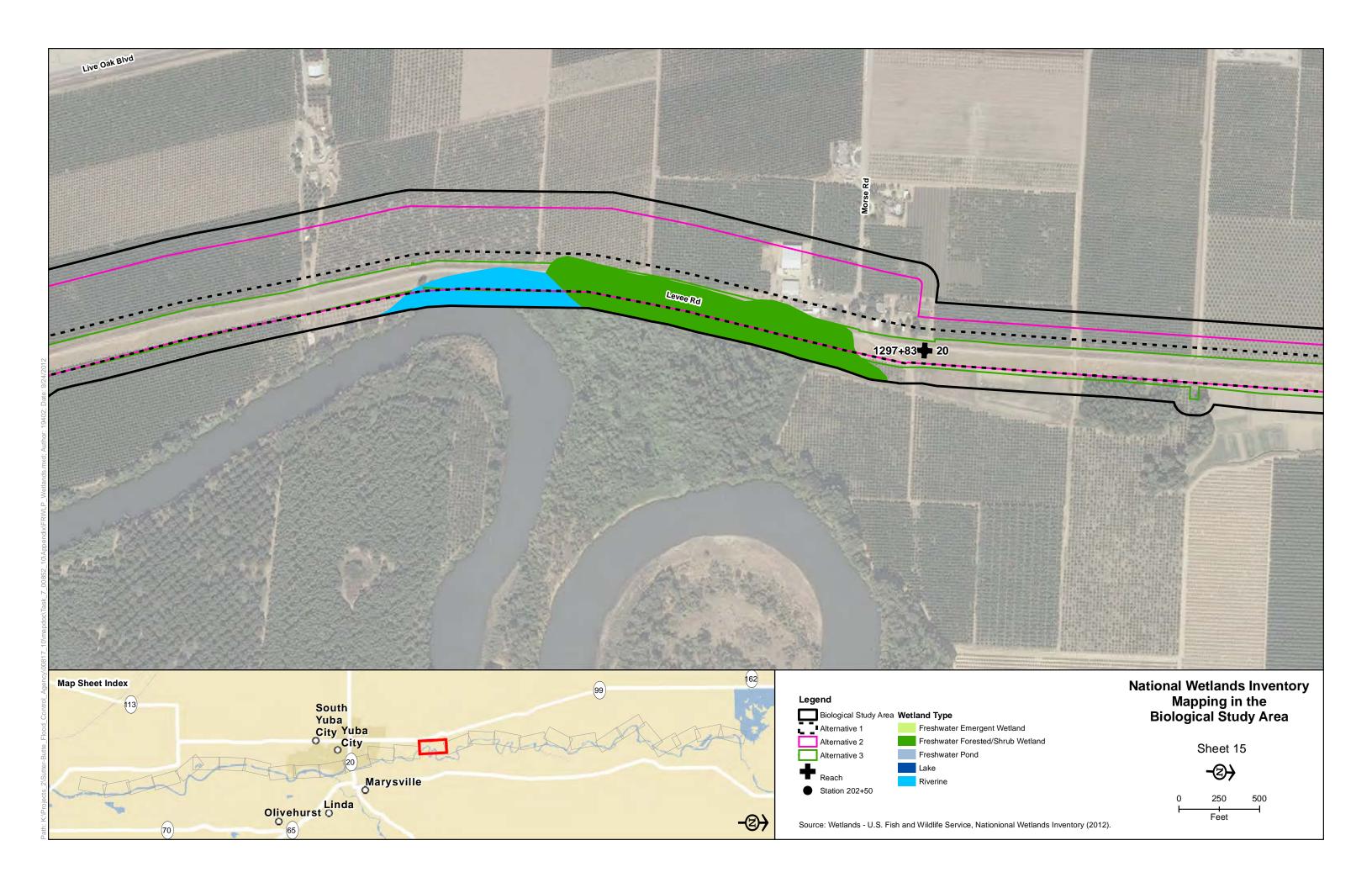


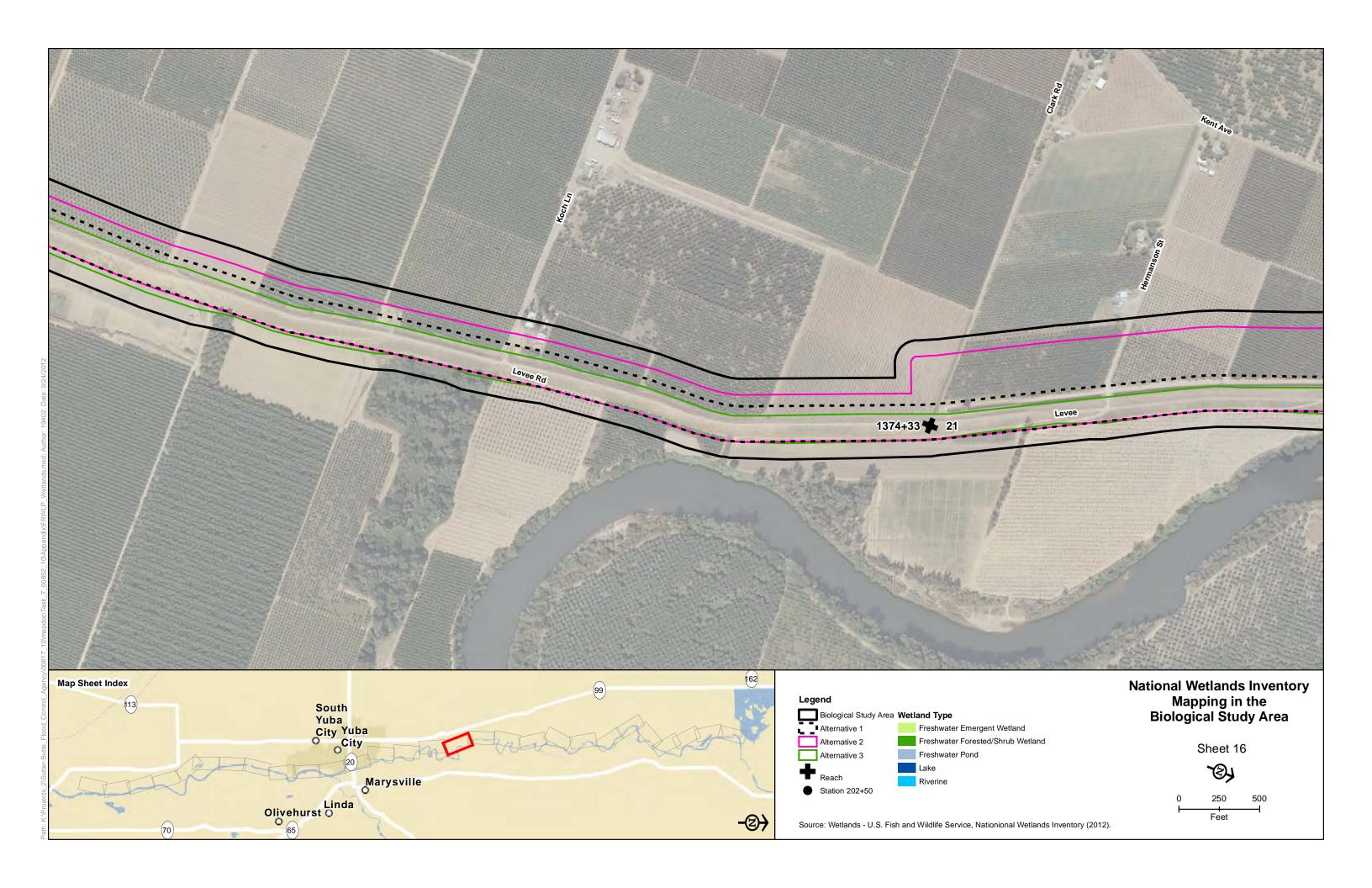


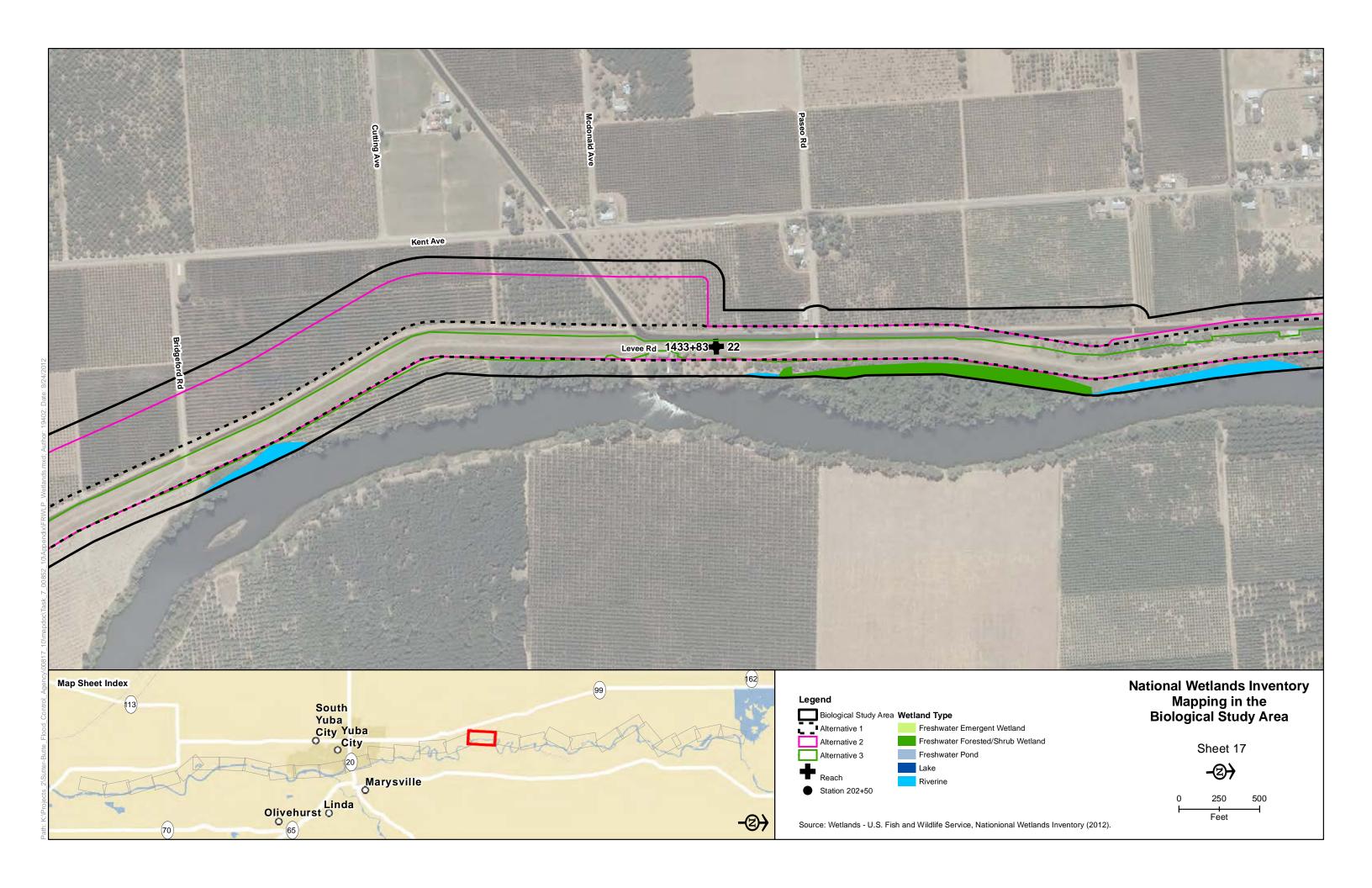


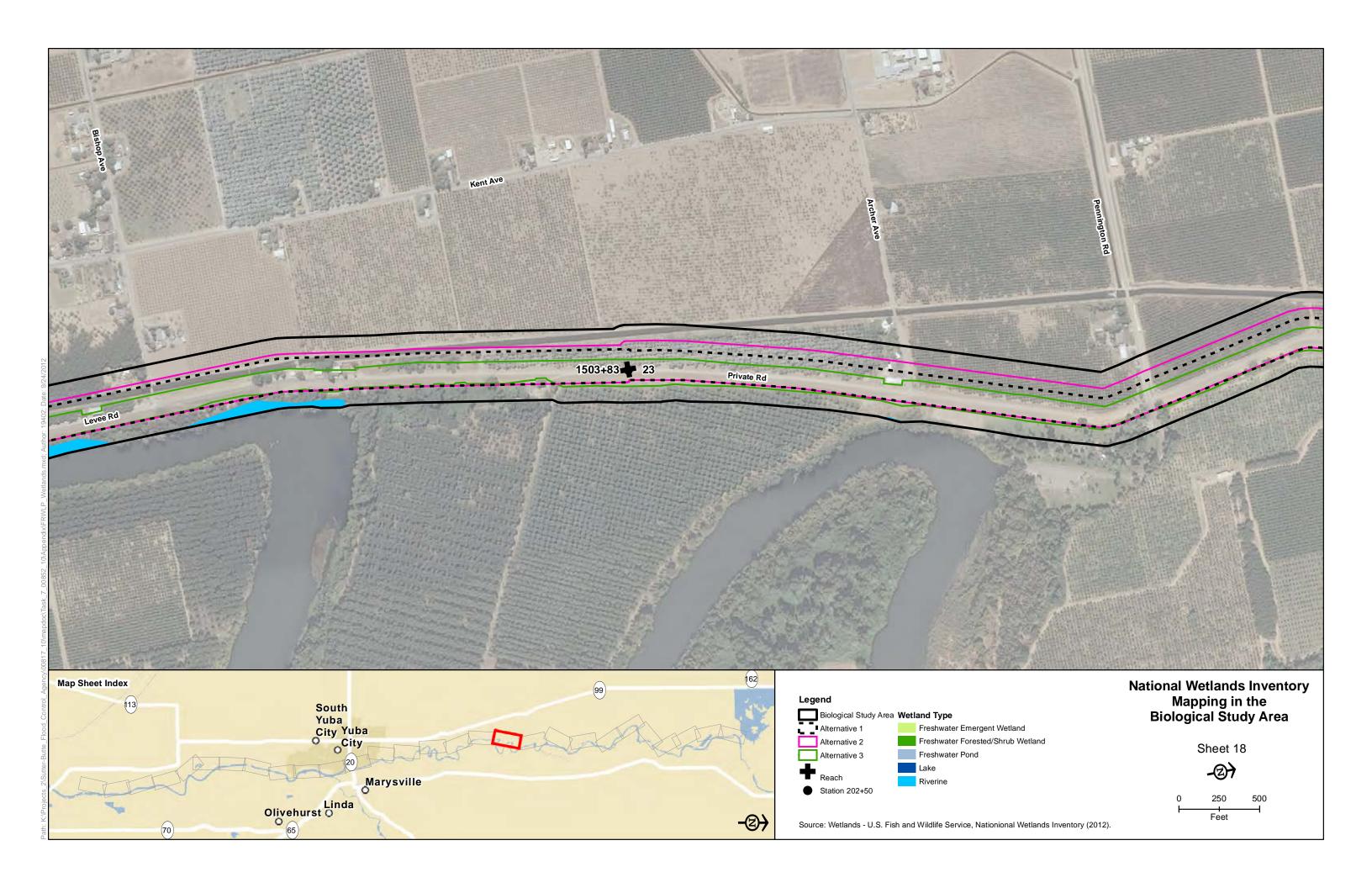


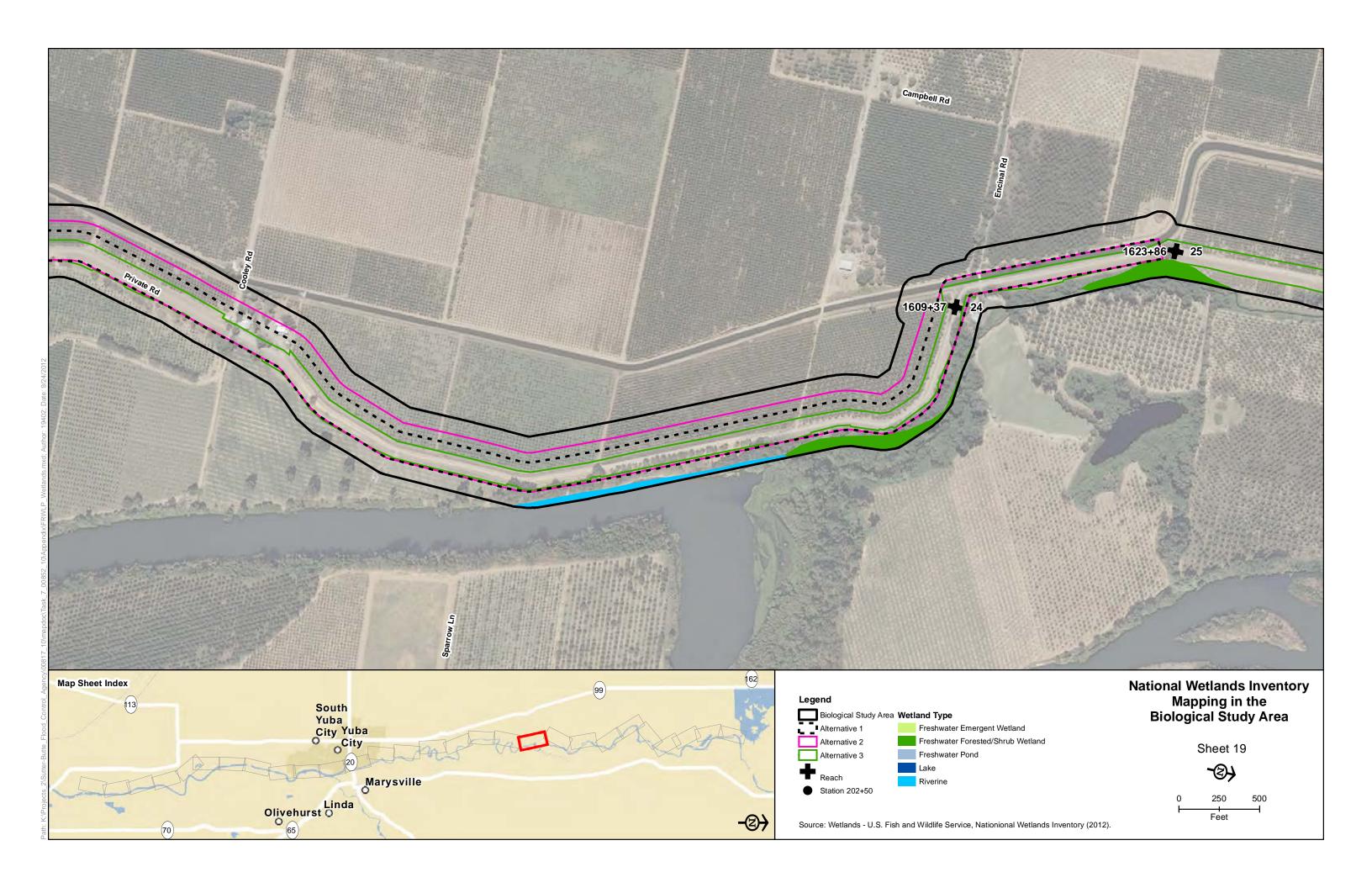


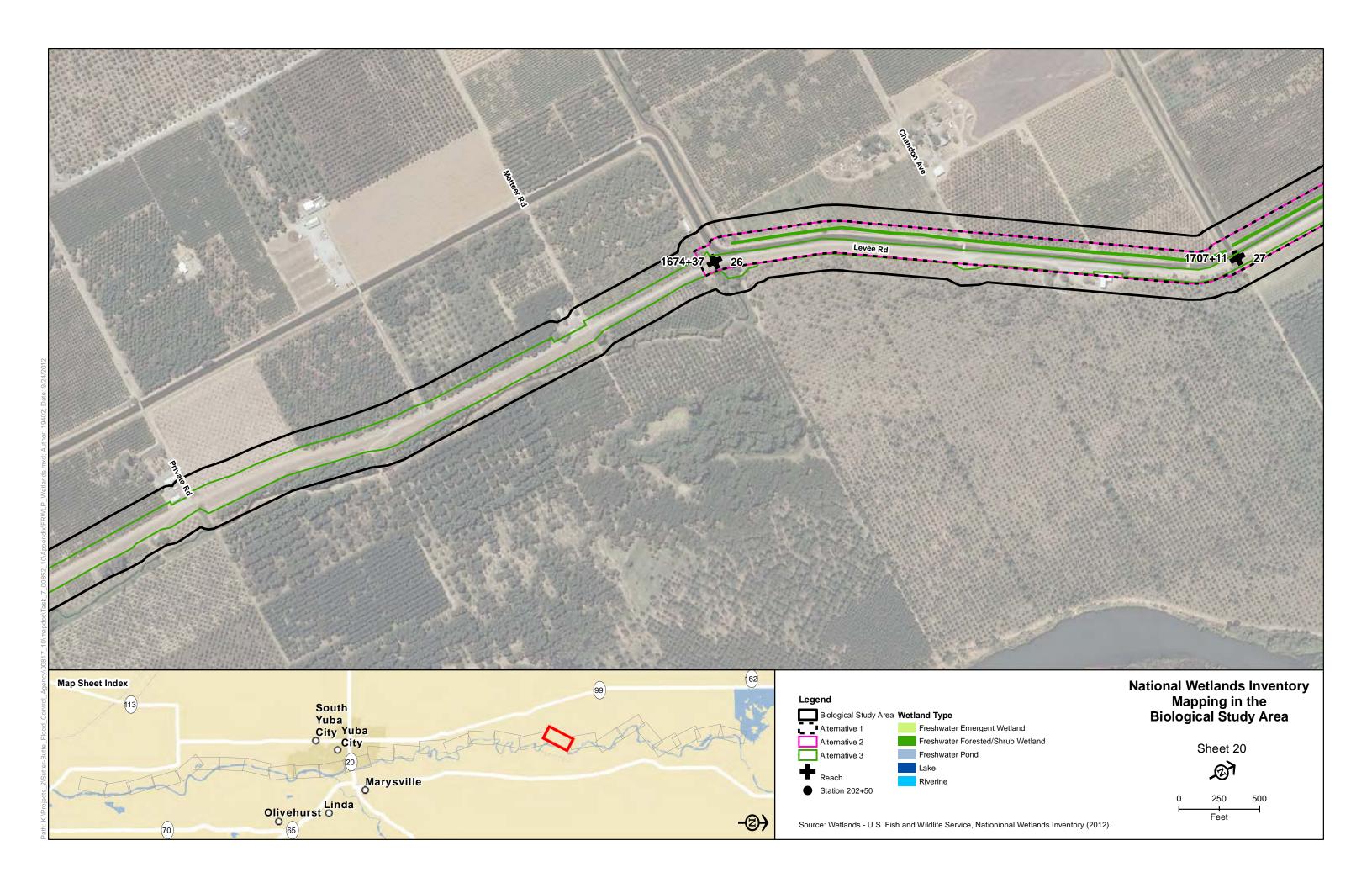


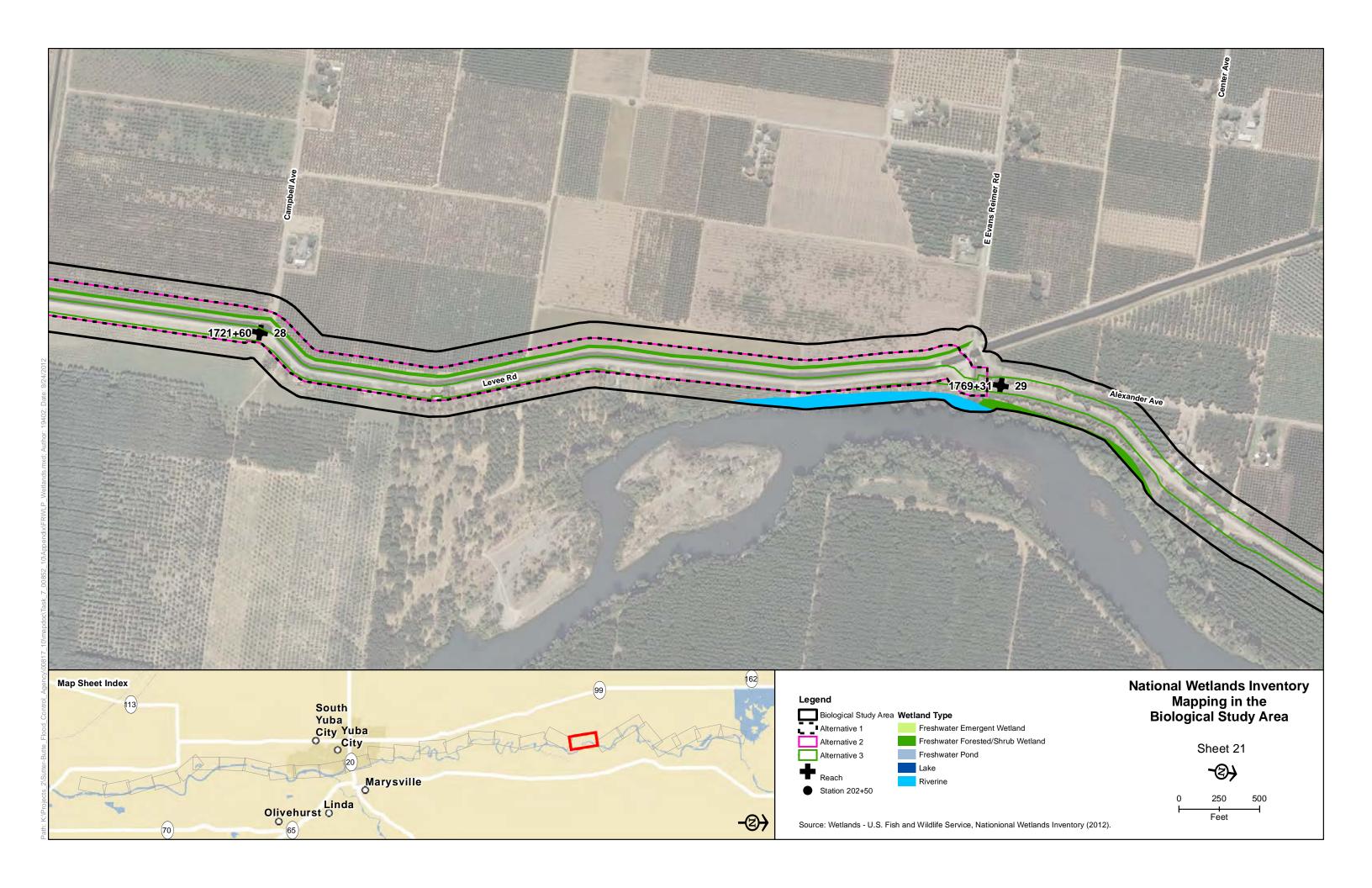


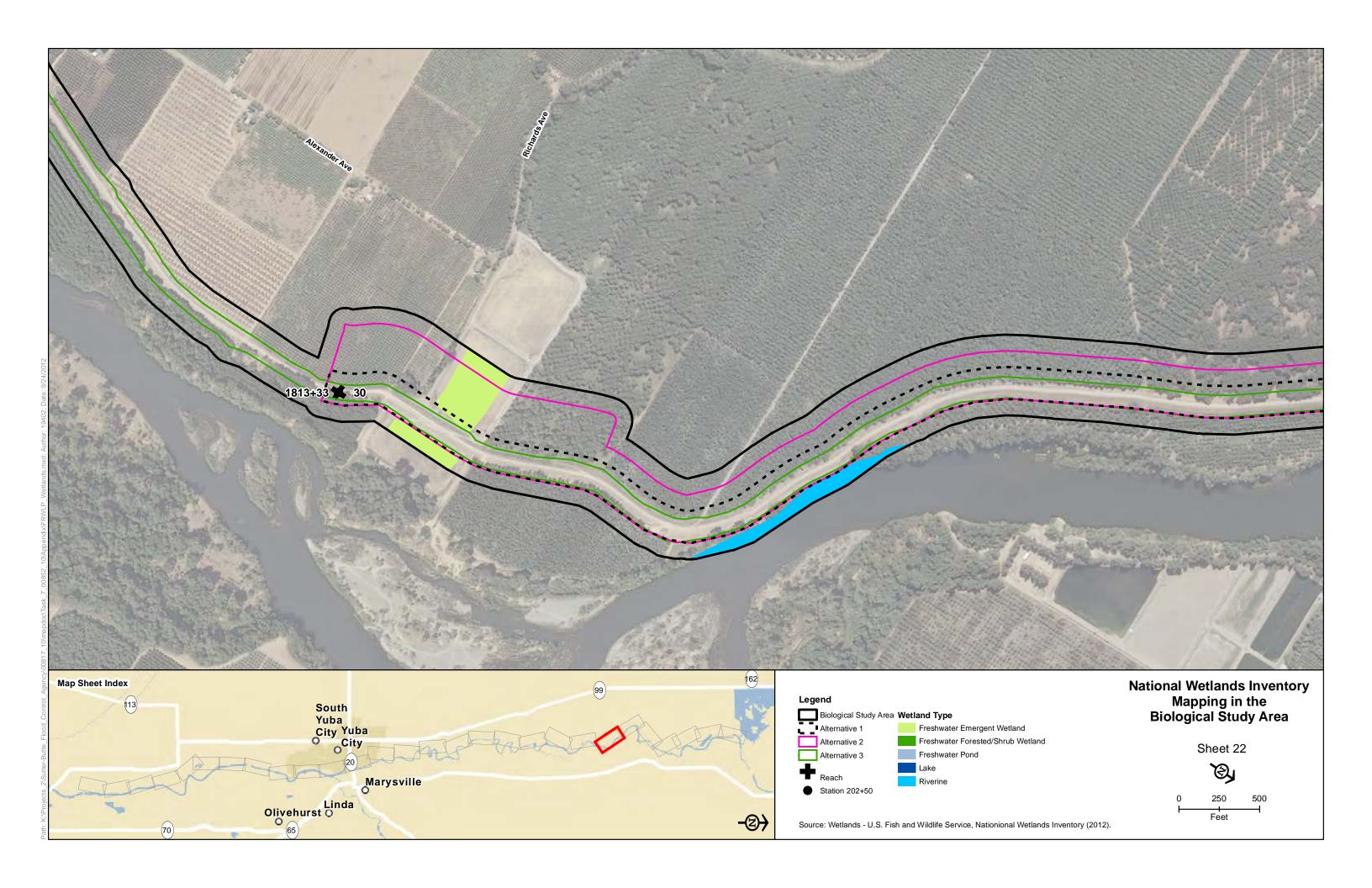


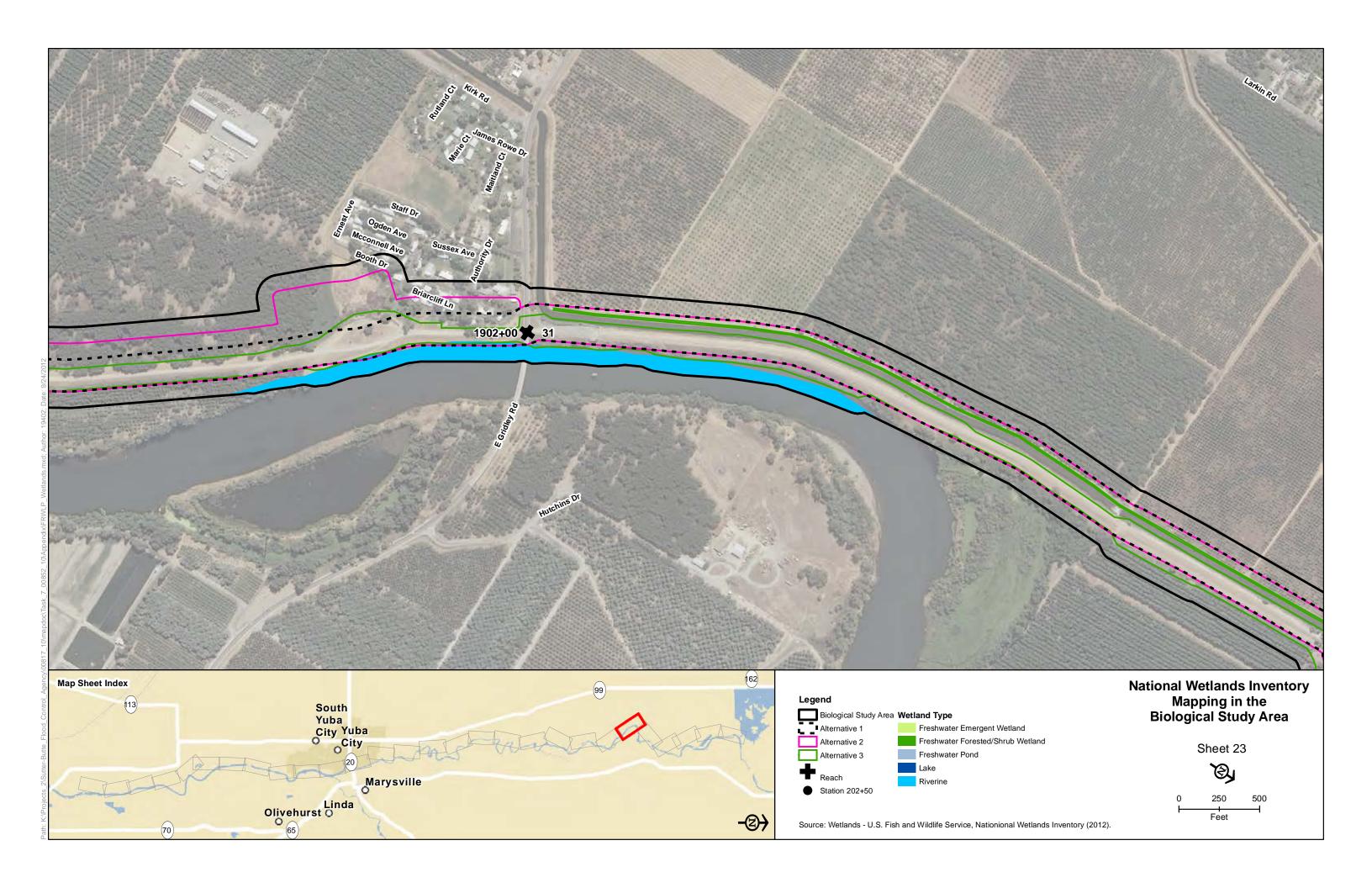


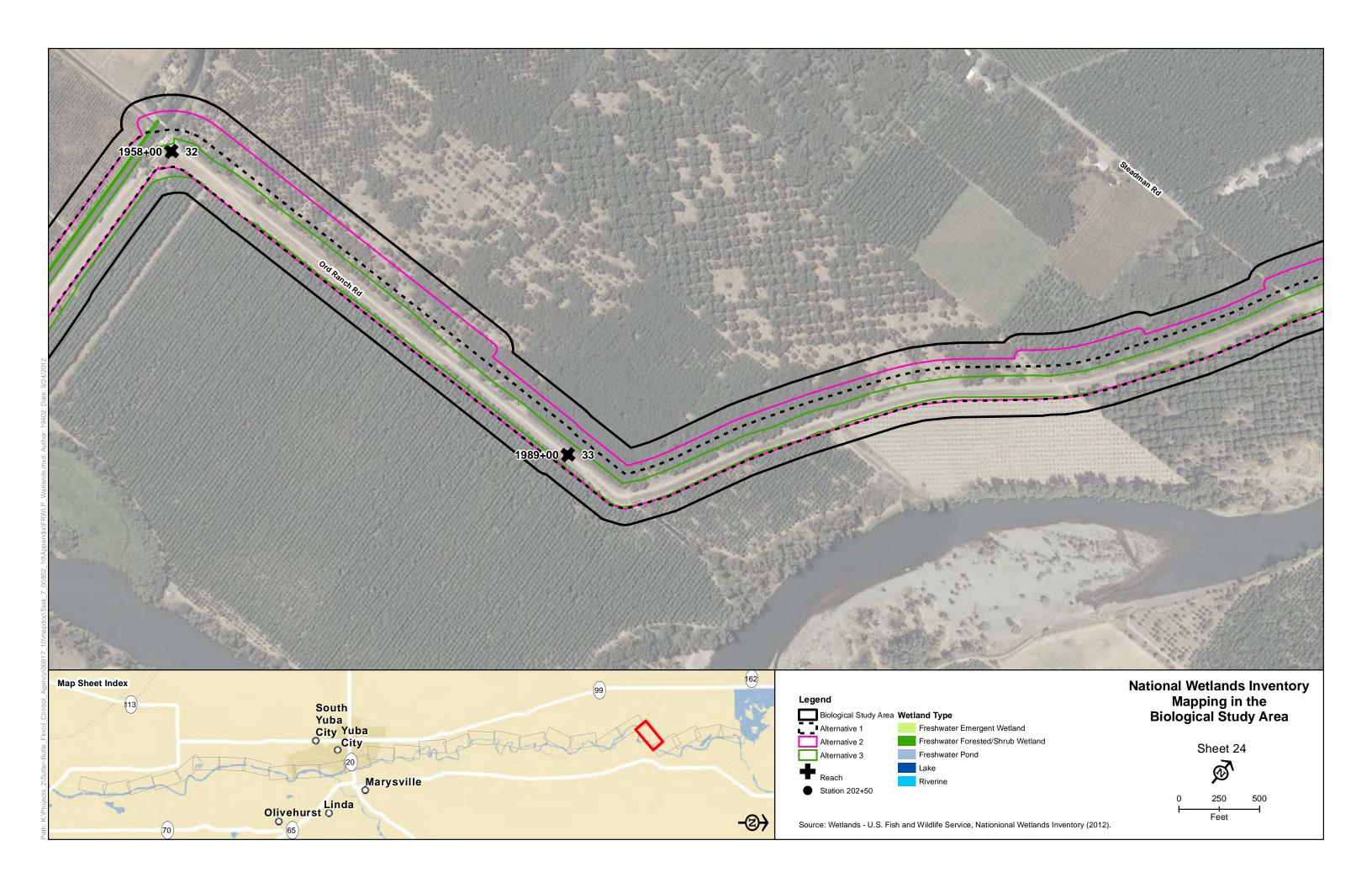


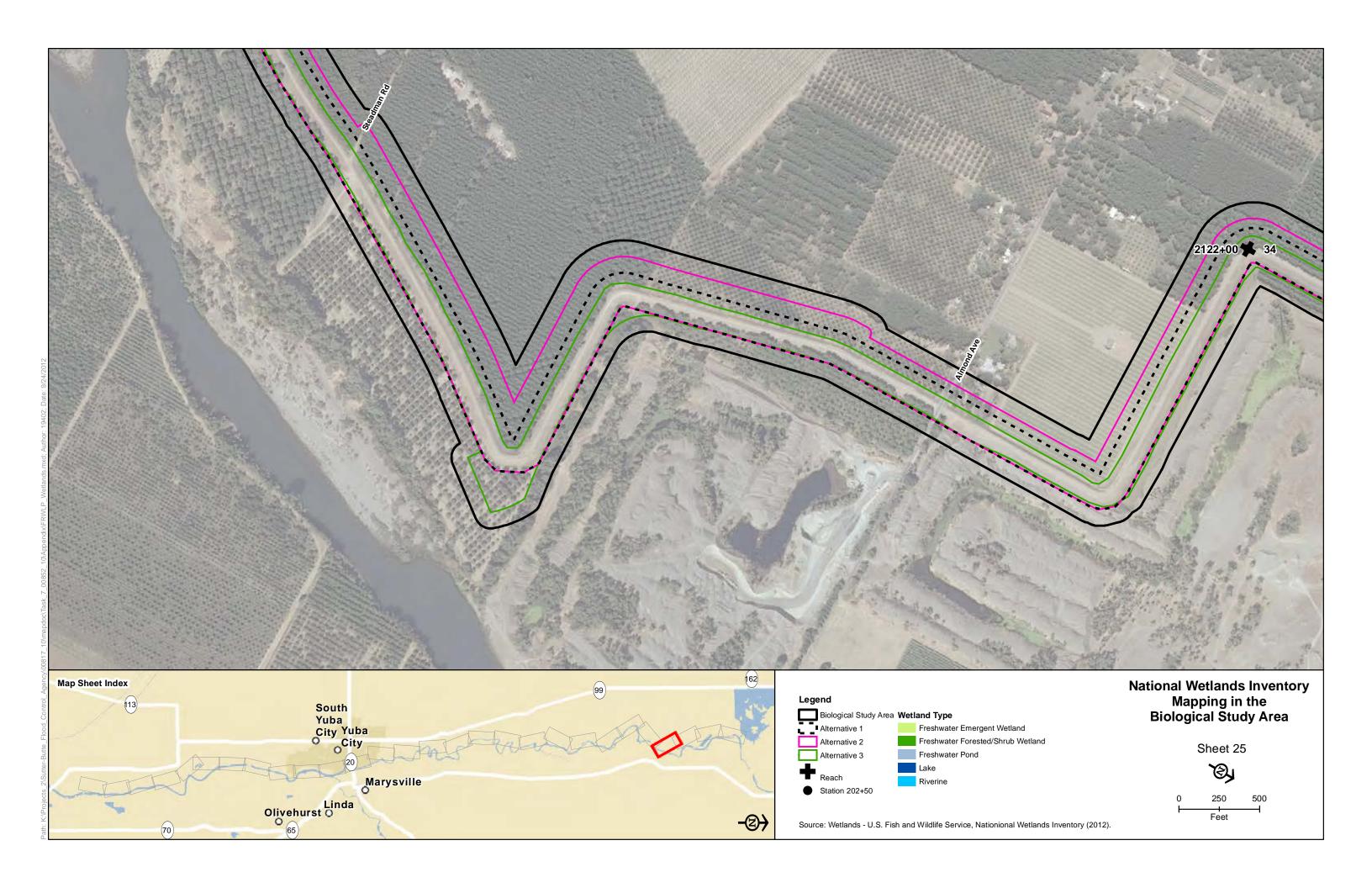


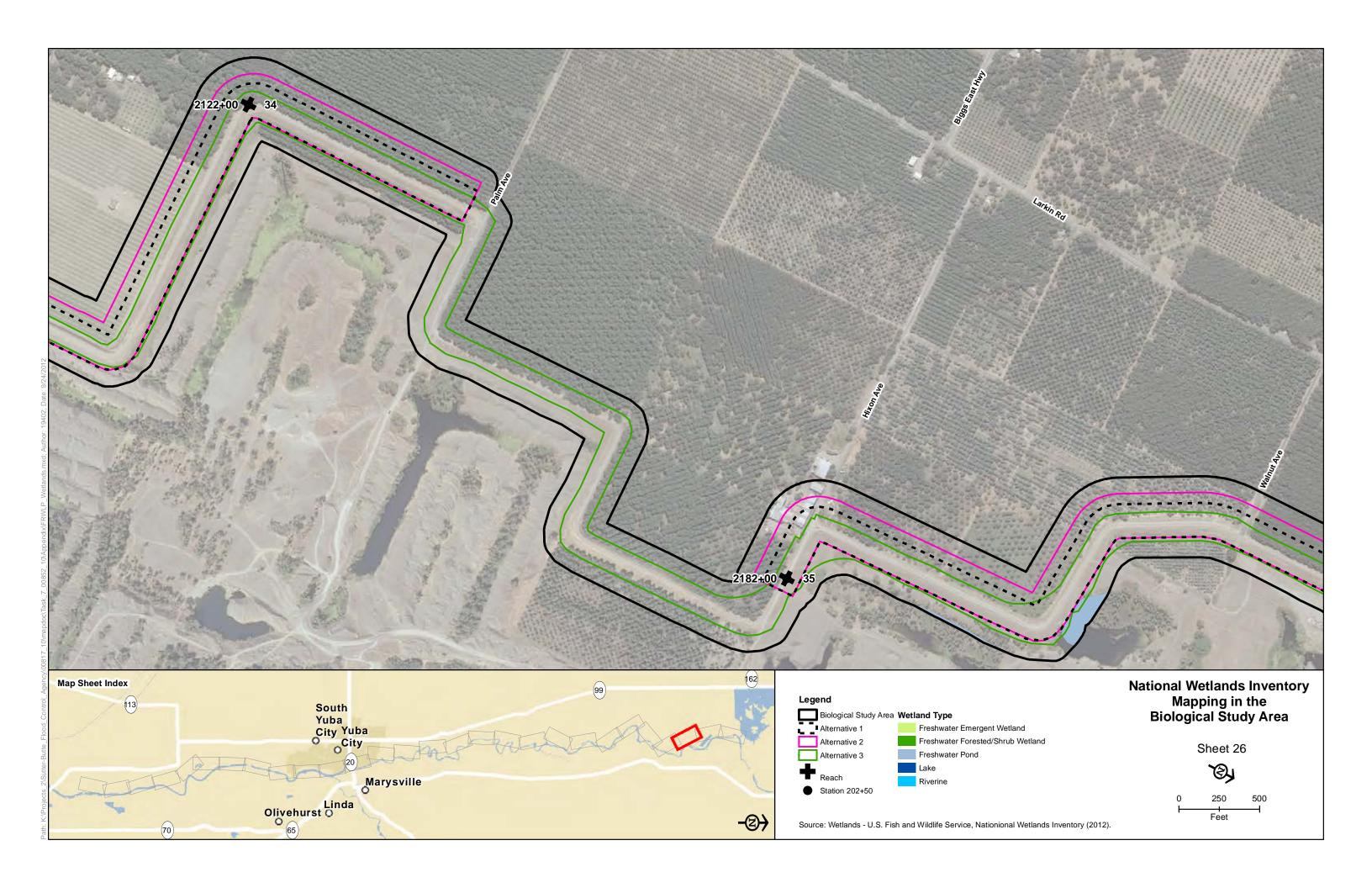


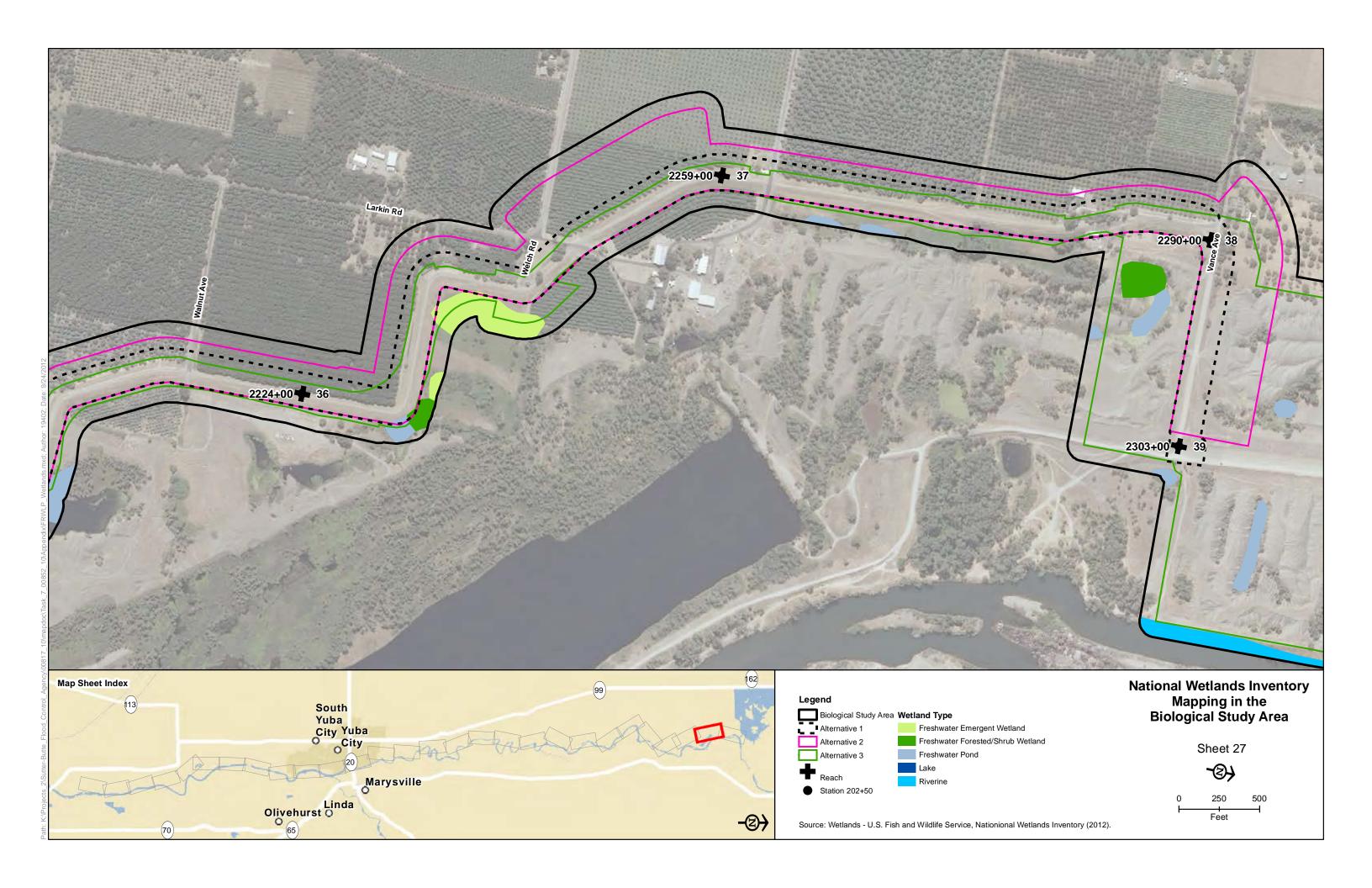


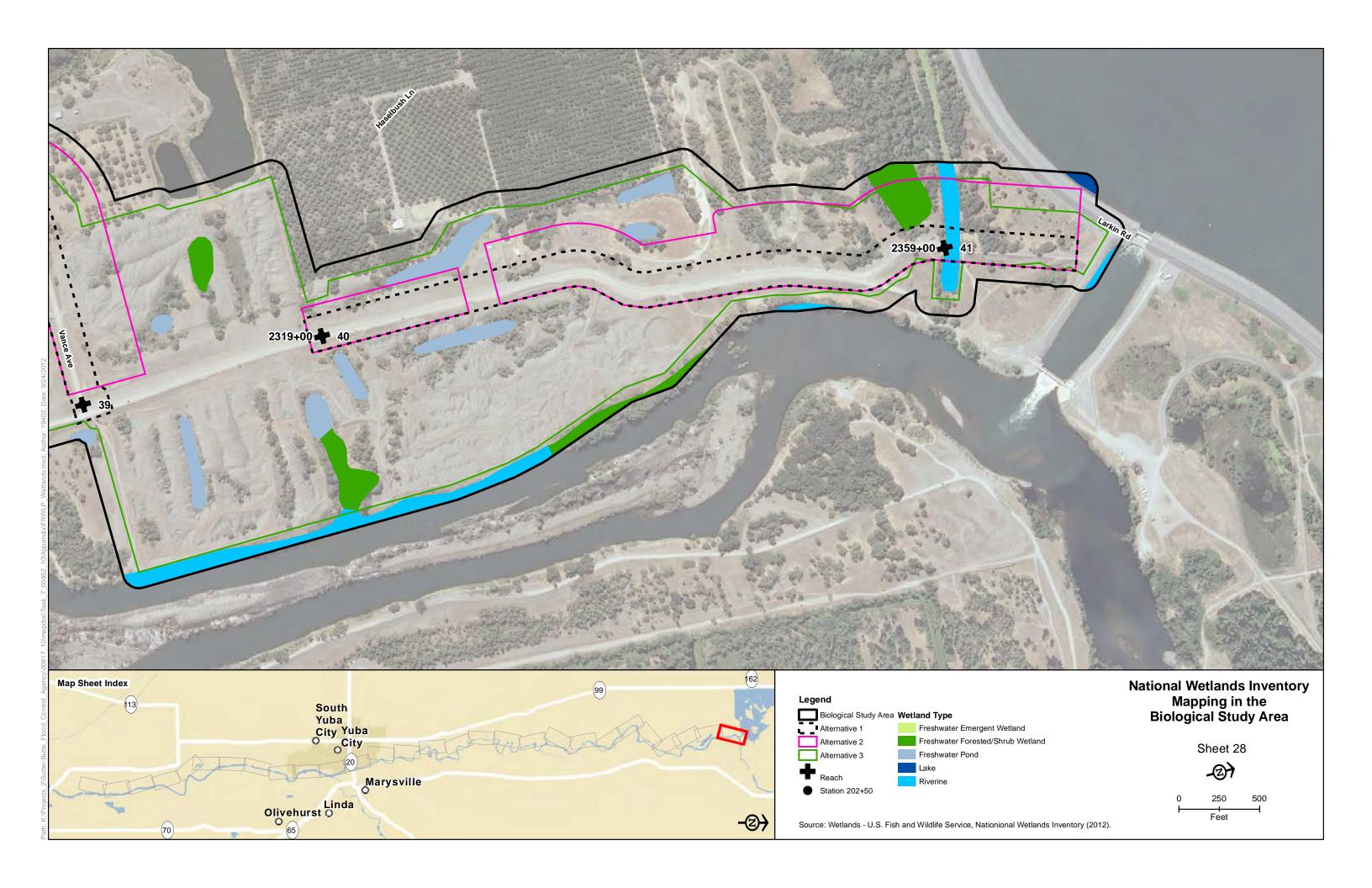












Appendix G SBFCA, FRWLP Approach for Addressing Existing Levee Encroachments



MEMORANDUM - DRAFT

TO:

Mr. Chris Krivanec, P.E., G.E., HDR, Inc.

FROM:

Jonathan Kors, P.E., PMP

DATE:

January 13, 2012

SUBJECT:

SBFCA, Feather River West Levee Project, Approach for Addressing Existing

Levee Encroachments

INTRODUCTION

In 2010, the Sutter Butte Flood Control Agency (SBFCA) embarked on the Feather River West Levee (FRWL) Project. The project seeks to rehabilitate 44 miles of existing levee along the west bank of the Feather River through Sutter and Butte Counties. A geotechnical assessment of the levees has been completed and the potential mitigation measures to address the deficiencies in each reach have been analyzed by the design team. The alternatives are outlined in detail in the Project Pre-design Formulation Report (PFR) (Reference 1). The design of the project is currently approaching the 65 percent level. For construction, the project is broken up into four contract packages, as described in Reference 2 below. The construction packages, listed in priority order, are as follows: Project C, Project D, Project B, and Project A. The limits of each project are shown on Figure 1. Project C and Project D will be constructed in 2013 and 2014, while Project A and Project B will be constructed in 2014 and 2015.

The levee in each project possesses numerous encroachments which will need to be addressed by the work because they either: a) present a threat to the stability of the levee system, b) do not currently comply with levee encroachment criteria; or c) will be disrupted or otherwise impacted by the levee rehabilitation work. Some of the encroachments have been reviewed and permitted by the Central Valley Flood Protection Board (CVFPB), while others pre-date the establishment of the State Reclamation Board (now the CVFPB), and have been "grandfathered" into the system. The permit status of others remains to be determined. Typical encroachments include pressure pipelines (water supply pipelines from waterside pump stations and drainage pipelines from landside drainage pump stations), gravity drainage pipes, gas lines, telephone utilities, overhead utilities, structural encroachments, and other types and variations as discussed below.

The purpose of this Memorandum is to provide a complete listing of the encroachments (as complete as possible based upon available information), outline the approach to handling project encroachments in general, and outline the approach to handling specific encroachments located within Project areas C and D.

MEMORANDUM – DRAFT January 4, 2012 Page 2 of 3

REFERENCES

- 1. HDR, Wood Rodgers, URS, and MHM, "Pre-design Formulation Report, Feather River West Levee Segments 1 through 7, Sutter Butte Levee Rehabilitation Program, Sutter and Butte Counties, California," February 2011.
- 2. Peterson Brustad, Inc., "Preliminary Construction Ordering Analysis," July 11, 2011.
- 3. Wood Rodgers and HDR, 30-Percent Design Drawings, February 2011.

MASTER ENCROACHMENTS LIST

MHM Engineers, the HDR design team member assigned primary design responsibility for utilities disrupted by the project, has developed a Master Encroachments List for identifying all utilities and encroachments on the project. To build the list, MHM performed a field review of the levee, listing all encroachments that were identifiable in the field. The physical location of encroachments identified were captured using GPS equipment. In addition, CVFPB encroachment logs were reviewed by MHM and compared with the encroachments identified in the field. Other sources of information included the U.S. Army Corps of Engineer's (USACE) Periodic Inspection Report and as-built documentation of various projects located along the alignment. The Master Encroachments List represents the most comprehensive source of information on encroachments impacted by the project. The list continues to be maintained by MHM and is updated as additional information becomes available. The current version of the list is included as Appendix A.

ENCROACHMENT NOMENCLATURE AND CATEGORIZATION

Given the number of encroachments the project must address and the variable nature of how each will be addressed, it was determined that a means to describe and categorize the encroachments was necessary to efficiently coordinate the work with regulatory agencies, utility owners, and the public. For this purpose, Wood Rodgers developed the outline presented on Figure 2. The outline divides all levee encroachments into two categories, those that only encroach on the levee right-of-way, and those that encroach on the levee prism itself. From this distinction, the categories are divided into three subcategories: Structural Encroachments, Wet Utility Encroachments, and Dry Utility Encroachments. These subcategories divide the encroachments in a manner that describes how the project will address them in general. In general, for levee Right-of-Way encroachments, all three categories will not be addressed by the project, but by SBFCA or the local maintaining agency over time. For Levee Prism encroachments, Structure and Wet Utility encroachments will be addressed in advance of the levee improvement contractor. Levee prism dry utility encroachments will be addressed in advance of the levee improvement contractor's work to clear the way for the levee improvements.

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PROJECT-SPECIFIC ENCROACHMENTS HANDLING

Wood Rodgers has reviewed the Master Encroachment List and the construction drawings (Reference 3), and has developed project specific listings for encroachments. The intent of these lists is to inform the reader how each individual encroachment will be handled by the project. The lists incorporate the nomenclature outlined in Figure 2. It is noted that the lists present some encroachments that are treated in a manner different than the general rules described above. In many cases, these encroachments fall into the exceptions described in the notes section of Figure 2. In addition, there are encroachments that either fully comply with all levee safety and encroachment criteria already, or are located in areas of the levee where work is not being performed (no work reaches). These encroachments also generally require treatment in a manner other than general case.

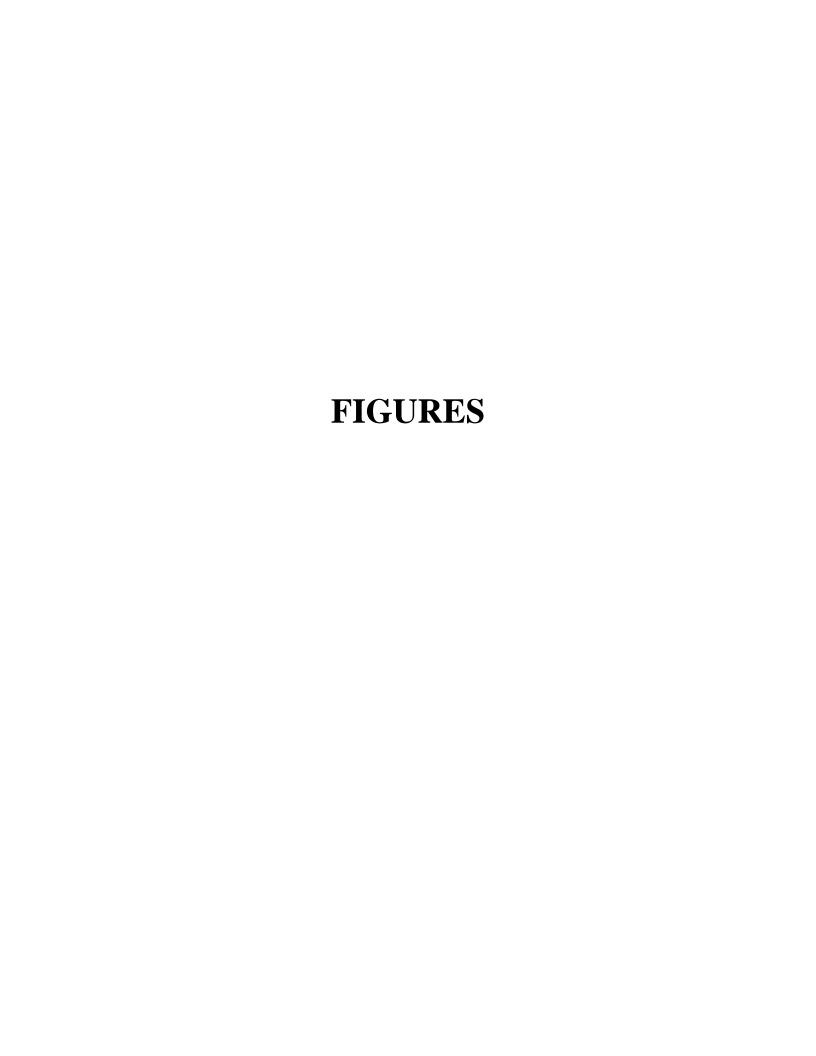
To determine how each specific encroachment is being treated, the Project-specific lists for Project C and Project D are included as Figure 2 and Figure 4, respectively. These lists are color coded to show how each encroachment will be addressed (or not addressed) by the project. Those addressed by the levee rehabilitation contractor during construction are coded blue. Those addressed by a separate contractor (or utility company) prior to the levee rehabilitation contractor are coded red, and those that will be addressed by SBFCA or the local levee maintaining agency (Levee District 1, Levee District 9, or MA 3, 12, or 16) over time, are coded green.

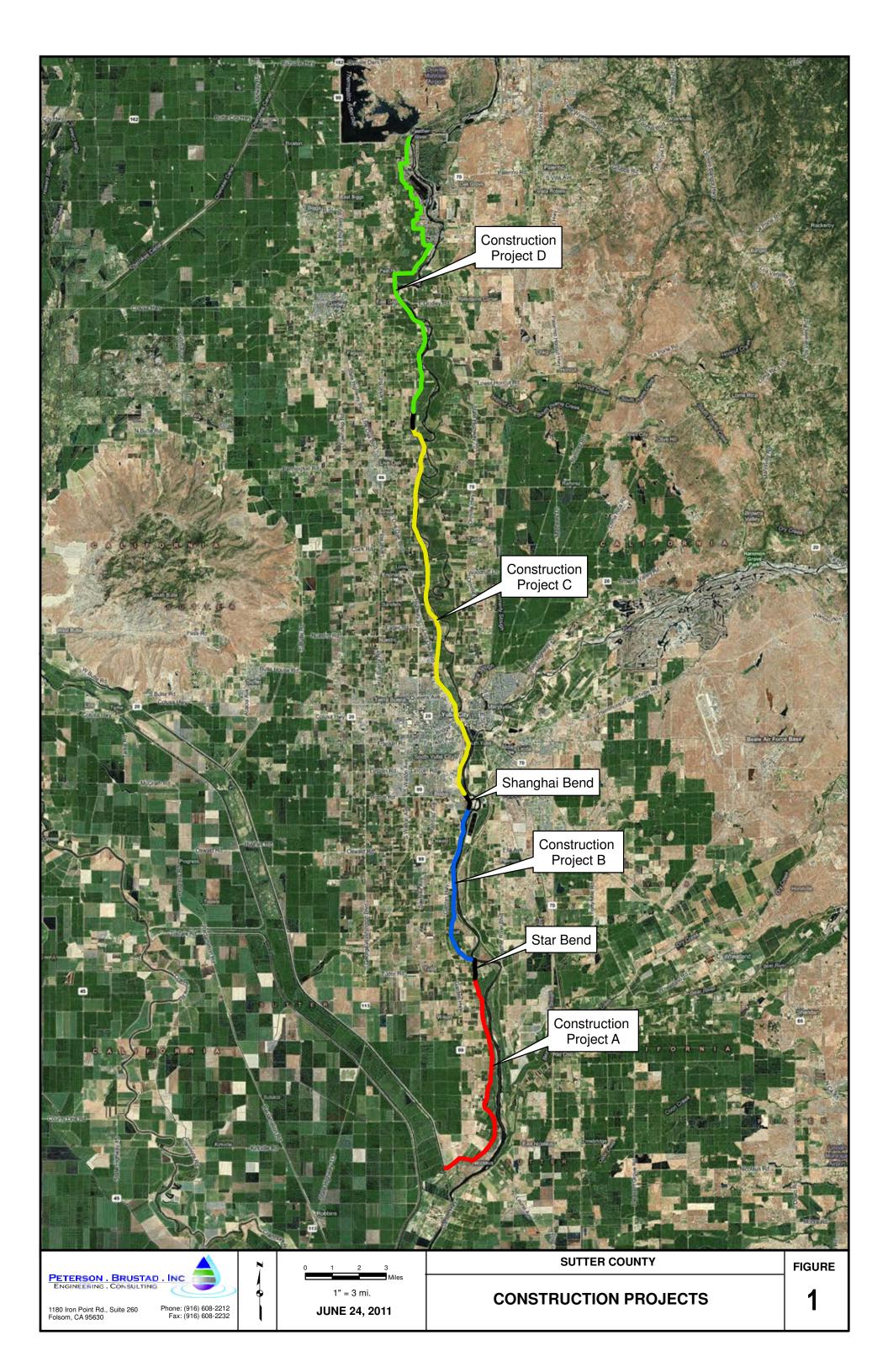
CONCLUSIONS AND RECOMMENDATIONS

It is proposed that these project-specific lists (and this Memorandum) be shared with the Department of Water Resources, CVFPB, and USACE, as well as affected members of the public, to communicate SBFCA's intentions for handling each encroachment encountered on the project. When this coordination has occurred, the design team should begin coordinating with the affected utility owners to advance the design of utility relocations on the project.

The final version of this Memorandum will address the handling of project encroachments for all Projects (A, B, C, and D).

Attachments

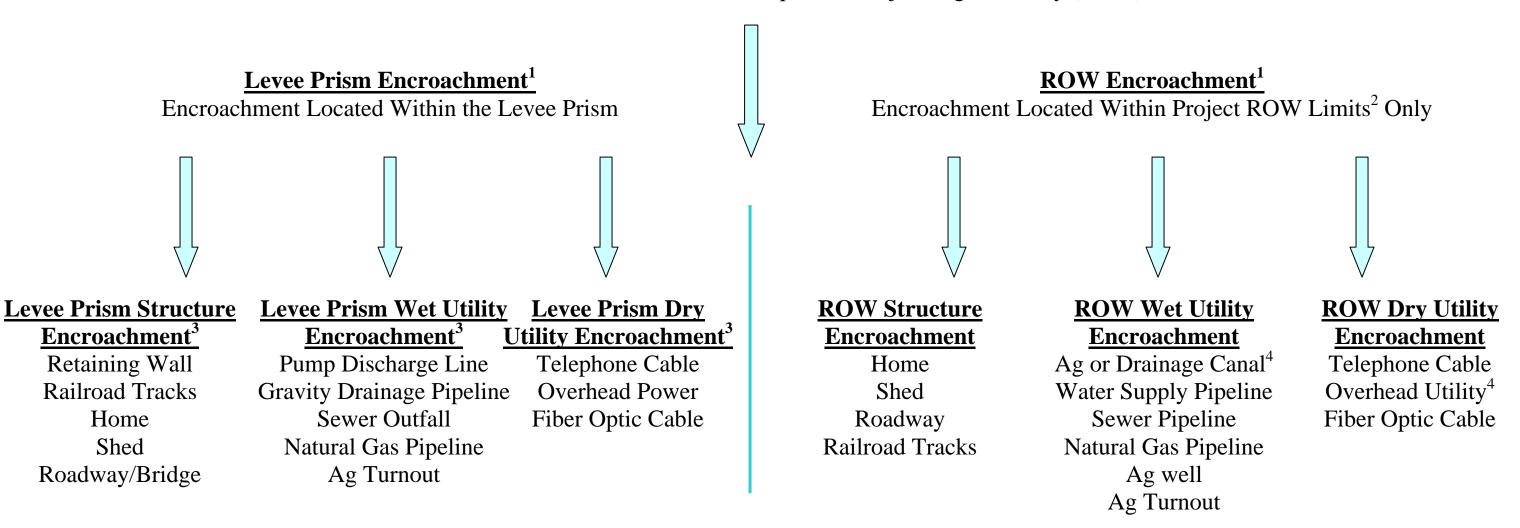




SUTTER BUTTE FLOOD CONTROL AGENCY FEATHER RIVER WEST LEVEE PROJECT PROPOSED NOMENCLATURE AND PROJECT APPROACH TO LEVEE ENCROACHMENTS

Levee Encroachment

All Utilities and Structures Within the Levee Footprint or Project Right-of-Way (ROW) Limits



Notes:

- 1. All utilities running parallel to the levee, unless located within the levee prism, are considered ROW Encroachments. All utilities running perpendicular to the levee are considered Levee Prism Encroachments, with the exception of overhead utilities, which are **ONLY** a levee prism encroachment if a supporting pole is located within the levee prism.
- 2. ROW Encroachments are those encroachments that fall within the limits of the Project ROW, 20 feet from landside levee toe, and 15 feet from waterside levee toe.
- 3. In general, levee prism structure and wet utility encroachments will be relocated or otherwise modified as part of the levee improvement contract. Levee prism dry utility encroachments will be addressed where expeditious or necessary to do so in advance of the levee improvement contract.
- 4. ROW wet or dry utility encroachments will be relocated prior to the levee improvement contract if they are deemed an impediment to construction access.

FIGURE 3

SUTTER BUTTE FLOOD CONTROL AGENCY FEATHER RIVER WEST LEVEE PROJECT

ENCROACHMENTS COORDINATION LIST - PROJECT C (STATION 845+00 TO 1623+86)

Color Coding Key-

Green: Addressed by SBFCA or Local Maintaining Agency over time Blue: Addressed by the levee rehabilitation contractor Black: Complies with criteria or is not impacted by levee rehabilitation work. Red: Addressed in advance of levee rehabilitation

STATION	TYPE	DESCRIPTION	OWNER	UTILITY DISRUPTED BY LEVEE WORK?	REMOVAL, RELOCATION, OR RETROFIT REQUIRED?	PERMITTED?
856+08	LP_WUE	24" seepage interceptor pump discharge line	City of Yuba City	Y	N N	Y
856+23	LP_WUE	24" storm drain pump discharge line	City of Yuba City	Ϋ́	N	Ϋ́
881+41	LP_WUE	6" and 14" relief well pump station	LD1 of Sutter County	Y	N	N
893+84	LP_WUE	12" storm drain pipe	City of Yuba City	Y	N	Y
893+84	LP_WUE	16" pump station discharge pipe (Burns Drive Pump Station)	City of Yuba City	Y	N	Ý
894+22	LP_DUE	24 kV underground cable	PG&E	Ϋ́	N	Ý
894+22	ROW_DUE	Utility pole at levee toe	PG&E	Ň	Y	Ϋ́
899+45	LP_WUE	12" pipe crossing	TBD	Y	N	Ý
912+94	LP_DUE	2 (16") gas lines	PG&E	Y	N	N
959+00 to 972+00	ROW_DUE	Overhead powerline, utility poles in close proximity to levee toe	TBD	N	Y	?
971+70	LP_DUE	Utility pole in levee slope	TBD	Υ	Υ	?
972+50 To 993+50	ROW_SE	Homes and outbuildings along 2nd Street	Various	N	Ϋ́	Ý
989+40	LP_SE	Outbuilding at 2nd Street	TBD	N	Ϋ́	Ϋ́
990+55	LP_SE	Outbuilding at 2nd Street	TBD	N	Ϋ́	Ý
990+75	LP_SE	Outbuilding at 2nd Street	TBD	N	Y	Y
992+45	LP_SE	Outbuilding at 2nd Street	TBD	N	Y	Y
992+75	LP_SE	Outbuilding at 2nd Street	TBD	N	Y	Y
995+75	LP_SE	County Courthouse storage building	Sutter County	N	Y	
998+50 to 1000+40	ROW_SE	Buildings at levee toe	TBD	N	Y	?
1003+72	LP_DUE	Utility pole in levee slope	PG&E	N	Y	N
1005+25	ROW_SE	Building at levee toe	TBD	N	Y	?
1006+07	LP_DUE	Utility pole in levee slope	PG&E	Υ	Υ	Υ
1006+93	LP_DUE	Utility and anchor pole	PG&E	Υ	Υ	Υ
1007+46	LP_DUE	Light pole for bike path on evee crown	City of Yuba City	N	N	N
1008+00 To 1025+00	ROW_DUE	Overhead power running parallel to LS levee toe	PG&E	N	Υ	Υ
1008+00 To 1014+00	LP_SE	Short retaining wall at LS levee slope, holds levee back from power poles		N	Υ	?
1008+75	LS_DUE	Utility pole in waterside levee slope	PG&E	Υ	Υ	Υ
1012+00	ROW_SE	Building at levee toe	TBD	N	Υ	?
1014+00 to 1018+00	ROW_SE	Buildings at levee toe	TBD	N	Υ	?
1019+00	LP WUE	4" Pipe abandoned in place above existing cutoff wall	TBD	N	N	N
1019+82	LP_DUE	Light pole for bike path on levee crown	TBD	N	N	N
1020+30	LP_DUE	Emergency telephone call box at levee waterside toe	Pac Bell	N	N	N
1022+15	LP_DUE	Light pole for bike path on levee crown	TBD	N	N	N
1025+00	LP_DUE	Utility pole in levee slope and parallel OH crossing (impacts gap closure)	PG&E	Υ	Υ	?
1026+78	LP_DUE	10" communications conduit beneath levee and river	TBD	Υ	N	Υ
1028+09	LP_DUE	Utility pole at levee crown	TBD	N	N	N

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Green: Addressed by SBFCA or Local Maintaining Agency over time	Blue: Addressed by the levee rehabilitation contractor	
Black: Complies with criteria or is not impacted by levee rehabilitation work.	Red: Addressed in advance of levee rehabilitation	

				DISRUPTED BY LEVEE	RELOCATION, OR RETROFIT	
STATION	TYPE	DESCRIPTION	OWNER	WORK?	REQUIRED?	PERMITTED?
1036+87	LP-DUE	Telephone conduit	Pac Bell	N	N	Υ
1037+90	LP-DUE	Telephone conduit	Pac Bell	N	N	Υ
1038+50	LP-DUE	8" gas line abandoned in place	TBD	N	Υ	N
1043+20	LP_WUE	Gilziser Slough drainage pump station - 4 pipes total	City of Yuba City	N	N	Υ
1043+40	LP_WUE	Abandoned Gilziser Slough Sewer Pipe	City of Yuba City	N	N	Υ
1054+75	LP_DUE	Emergency telephone call box at levee landside slope	Pac Bell	N	N	N
1055+00	LP_DUE	Light pole for bike path in levee slope	TBD	N	N	N
1073+41	LP_DUE	16-inch gas line	PG&E	N	N	N
1094+40	LP_DUE	3" steel pipe crossing - abandoned	TBD	Υ	Υ	?
1096+75	LP_WUE	Yuba City raw water intake facility (3 Pipes)	City of Yuba City	Υ	N	Υ
1097+00	ROW_DUE	Utility pole in close proximity to levee toe	PG&E	N	Υ	Υ
1107+82	LP_DUE	Utility and Anchor Pole	PG&E	Υ	Υ	N
1111+50	LP_WUE	Yuba City north area drainage pipe	City of Yuba City	Υ	N	Υ
1126+00 to 1131+30	ROW_DUE	Overhead powerline, utility poles in close proximity to levee toe	TBD	N	Υ	?
1131+00	LP_SE	Union Pacific railroad tracks	UPRR	Υ	Υ	Υ
1131+50	LP_DUE	Fuel line	UPRR	Υ	Υ	Υ
1132+61	LP_DUE	Underground fiber optic cable marker	TBD	Υ	Υ	?
1135+40	LP_WUE	16" gas line	PG&E	Υ	N	Υ
1139+25	LP_DUE	Utility pole and anchor pole	PG&E	Υ	Υ	?
1152+40	ROW_DUE	Twin 110kV utility tower at levee toe	PG&E	N	Υ	Υ
1170+05	LP_DUE	Utility pole and anchor pole	PG&E	Υ	Υ	?
1174+00	ROW_WUE	Ag well in close proximity to levee toe	Private	N	Υ	?
1174+35	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	N
1176+90	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	N
1179+05	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	?
1179+05 to 1201+25	ROW_DUE	Overhead power running parallel to LS levee toe	PG&E	N	Υ	?
1180+75	LP_WUE	12" pipe crossing - abandoned	TBD	N	Υ	?
1181+00	LP_WUE	3" irrigation pipe crossing - abandoned	TBD	N	Υ	?
1182+15	LP_WUE	8" drainage pipe crossing - abandoned	TBD	N	Υ	?
1182+75	LP_WUE	20" irrigation pipeline (may not be in place at this time)	Private	Υ	N	Υ
1200+60	ROW_WUE	Pump station at levee toe	Private	N	Υ	N
1200+68	LP_WUE	10" irrigation pipeline - abandoned	Private	Υ	N	N
1222+15	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	N
1223+80	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	N
1225+90	LP_DUE	Utility pole at levee crown	PG&E	Υ	Υ	N
1229+43	ROW_WUE	Pump station within 10' of toe	Private	N	Υ	Υ
1229+43	LP_WUE	16" pump station discharge pipe	Private	Υ	Υ	Υ
1265+55	LP_WUE	18" pump station discharge pipe - abandoned	Private	N	Υ	Υ
1266+80	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	N
1284+91 to 1293+66	ROW_WUE	Concrete lined ditch	Private	N	Υ	N
1289+50 to 1291+50	ROW_SE	Farm structures and out buildings in close proximity to levee toe	Private	N	Υ	N
1293+66	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	

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UTILITY

REMOVAL,

Green: Addressed by SBFCA or Local Maintaining Agency over time	Blue: Addressed by the levee rehabilitation contractor
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STATION	TYPE	DESCRIPTION	OWNER	UTILITY DISRUPTED BY LEVEE WORK?	REMOVAL, RELOCATION, OR RETROFIT REQUIRED?	PERMITTED?
1298+60 to 1315+02	ROW_WUE	Seepage interceptor trench	LD9	N	N	N
1314+80	LP_WUE	20" pump station discharge pipeline	Private	Υ	N	Υ
1327+00	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	N
1347+06	LP_DUE	Telecommunication line	TBD	Υ	Υ	N
1375+75 To 1430+50	ROW_WUE	Sutter Extension Sunset Lateral Ditch	Sutter Extension	N	N	Υ
1429+80	ROW_WUE	Overhead powerlines, utility poles at waterside levee toe	PG&E	Υ	Υ	N
1430+50	ROW_SE	Pump station and electrical equipment at landside toe	Sutter Extension	N	N	Υ
1430+50	LP_WUE	36", and (2) 60" pump station discharge pipes (Sunset Pump Station)	Sutter Extension	Υ	Υ	Υ
1430+50 To 1490+00	ROW_WUE	Sutter Extension Main Canal	Sutter Extension	N	N	N
1460+65	LP_WUE	6" PVC irrigation pipeline	Private	Υ	Υ	N
1463+00	ROW_SE	Reisdence in close proximity to levee toe	Private	N	Υ	N
1470+00	LP_SE	Ramp to residence on landside at levee crown	Private	Υ	Υ	N
1470+00	ROW_SE	Residence on pile foundation at landside levee toe	Private	N	Υ	N
1473+50	LP_SE	Fence at waterside levee toe	Private	Υ	Υ	N
1479+98	LP_SE	Private gate across levee	Private	Υ	Υ	N
1482+00 To 1486+00	ROW_SE	Private residences in close proximity to levee landside toe	Private	N	Υ	N
1518+50 To 1520+50	ROW_SE	Large shop structure at landside levee toe	Private	N	Υ	N
1520+25	ROW_DUE	Utility pole in levee slope	TBD	N	Υ	N
1528+35	LP_WUE	6" steel pipe crossing	Private	Υ	Υ	Υ
1532+86	LP_WUE	6" steel pipe crossing	Private	Υ	Υ	Υ
1536+00	ROW_DUE	Utility pole and guy wire at levee toe	PG&E	N	Υ	N
1536+15	LP_WUE	36" pipe crossing	RD 777	Υ	Υ	Υ
1549+70	LP_WUE	12" pipe crossing	TBD	Υ	Υ	Υ
1556+00 To 1558+00	ROW_SE	Residences at landside levee toe	Private	N	Υ	N
1556+35	ROW_DUE	Utility pole in close proximity to levee toe	PG&E	N	Υ	Υ
1556+50	LP_WUE	8" pipe crossing through levee	Private	Υ	Υ	Υ
1585+60	LP_WUE	12" pipe crossing through levee	Private	Υ	Υ	Υ
1610+91	LP_WUE	18" CM pipe crossing	RD 777	Υ	Υ	Υ
1611+50	ROW_SE	Residence at levee waterside toe and driveway at levee crown	Private	Υ	Υ	N
1610+50 To 1623+86	ROW_WUE	Sutter Butte Main Canal at landside toe	Sutter Extension	Υ	N	Υ

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FIGURE 4

SUTTER BUTTE FLOOD CONTROL AGENCY FEATHER RIVER WEST LEVEE PROJECT

ENCROACHMENTS COORDINATION LIST - PROJECT D (STATION 1623+86 TO 2368+00)

Color Coding Key-

Green: Addressed by SBFCA or Local Maintaining Agency over time

Black: Complies with criteria or is not impacted by levee rehabilitation work.

Blue: Addressed by the levee rehabilitation contractor Red: Addressed in advance of levee rehabilitation

STATION	TYPE	DESCRIPTION	OWNER	UTILITY DISRUPTED BY LEVEE WORK?	REMOVAL, RELOCATION, OR RETROFIT REQUIRED?	PERMITTED?
1635+50	ROW_SE	Farm structure in close proximity to levee toe	Private	N	Υ	N
1637+60 to 1638+50	ROW_SE	Farm structure and fence in close proximity to levee toe	Private	Ν	Υ	N
1638+99	LP_WUE	(2) 24" steel pipe crossing	RD 777	N	Υ	Υ
1651+80	LP_DUE	Utility pole in levee slope	PG&E	N	Υ	N
1654+20	LP_DUE	Utility pole at levee toe	PG&E	N	Υ	N
1663+80 to 1664+90	ROW_SE	House and outbuilding at landside toe	Private	N	Υ	N
1665+30 to 1674+50	ROW_DUE	Utility poles and overhead powerlines at landside toe	PG&E	N	Υ	N
1674+50 to 1766+00	ROW_WUE	Sutter Butte Main Canal at landside toe	Sutter Extension	N	N	Υ
1675+27	LP_WUE	60"x72" RCP culvert	Butte County			
			Drainage District			
			No.1	N	Υ	Υ
1675+96	ROW_DUE	Utility pole in levee slope	TBD	N	Υ	N
1675+96 to 1705+00	ROW_DUE	Utility poles and overhead powerlines at landside toe	TBD	N	Υ	?
1697+95	ROW_DUE	Utility pole at levee toe	AT&T	N	Υ	Υ
1698+50	ROW_SE	Farm structure in close proximity to levee toe	Private	N	Υ	N
1699+62	ROW_WUE	Propane tanks at levee toe	Private	N	Υ	N
1706+82 to 1724+82	ROW_SE	Fence at waterside levee toe	Private	N	Υ	Υ
1722+60 to 1734+10	ROW_DUE	Overhead powerlines, utility poles in waterside slope	TBD	N	Υ	N
1728+29	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	Υ
1730+00	ROW_SE	Residence in close proximity to levee toe	Private	N	Υ	N
1734+00	ROW_DUE	Utility pole at levee toe	TBD	N	Υ	?
1738+10	ROW_SE	Residence at waterside levee toe and driveway at levee crown	Private	N	Υ	N
1741+32	LP_WUE	16" drainage pipe crossing	Butte County			
			Drainage District			
			No.1	N	Υ	N
1756+27	LP_WUE	12" CM pipe crossing - abandoned	TBD	N	Υ	N
1765+15	LP_WUE	12" steel pipe crossing	TBD	N	Υ	N
1765+33	LP_WUE	12" plastic sleeved concrete irrigation pipe	Private	N	Υ	Υ
1767+60	LP_WUE	(2) 60" drainage pipes	Butte Water District,			
			Sutter Extension			
			Water District	N	Υ	Υ
1777+00	LP_WUE	24" CM drainage pipe	TBD	N	Υ	Υ
1781+50	ROW_SE	Farm structure in close proximity to levee toe	TBD	N	Υ	N
1782+50	ROW_DUE	Utility pole at levee toe	TBD	N	Υ	?
1784+70	LP_WUE	24" CM drainage pipe crossing	TBD	N	Υ	Υ
1785+25	LP_WUE	24" CM drainage pipe crossing	TBD	N	Υ	Υ

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Green: Addressed by SBFCA or Local Maintaining Agency over time

Black: Complies with criteria or is not impacted by levee rehabilitation work.

Blue: Addressed by the levee rehabilitation contractor Red: Addressed in advance of levee rehabilitation

				DISRUPTED BY LEVEE	RELOCATION, OR RETROFIT	
STATION	TYPE	DESCRIPTION	OWNER	WORK?	REQUIRED?	PERMITTED?
1786+00 to 1787+40	ROW_SE	Residence and outbuilding in close proximity to levee toe	TBD	N	Υ	?
1792+96	LP_WUE	24" CM drainage pipe crossing - abandoned	TBD	N	Υ	Υ
1799+43	LP_WUE	8" irrigation pipe crossing	Private	N	Υ	Υ
1809+65	LP_WUE	24" CM drainage pipe crossing	TBD	N	Υ	Υ
1813+70	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
1816+63 to 1823+20	ROW_SE	Chain link fence at waterside and landside levee toe	City of Gridley	N	Υ	Υ
1816+63 to 1823+00	ROW_WUE	Sewer ponds in close proximity to waterside and landside levee toe	City of Gridley	N	Υ	N
1818+72	LP_WUE	24" CM pipe crossing	City of Gridley	Υ	Υ	Υ
1823+05	LP_WUE	12" cement coated and lined steel pipe through 24" CM pipe crossing	City of Gridley	Υ	Υ	Υ
1834+41	LP_WUE	12" pipe through 24" CM pipe crossing	TBD	Υ	Υ	Υ
1850+02	LP_WUE	18" cast iron sewer pipe crossing	City of Gridley	Υ	Υ	Υ
1868+17	LP_WUE	18" drainage pipe crossing	Butte County			
			Drainage District	Υ	Υ	N
1888+52	LP_WUE	8" steel pipe crossing	City of Gridley	Υ	Υ	Υ
1889+97	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	Υ
1892+00	ROW_DUE	Utility pole in close proxitmity to levee toe	PG&E	N	Υ	?
1893+70	LP_WUE	3/4" galvanized iron water pipe crossing	TBD	Υ	Υ	Υ
1895+10	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	?
1896+90 to 1900+20	ROW_SE	Residences in close proximity to landside levee toe	TBD	N	Υ	?
1900+82 to 1906+60	ROW_DUE	Overhead powerlines, utility poles in landside slope	PG&E	Υ	Υ	N
1903+00 to 1957+00	ROW_WUE	Sutter Butte Main Canal at landside toe	Sutter Extension	N	N	Υ
1903+96	LP_DUE	Guy wire over levee, guy pole at waterside of levee crown	PG&E	Υ	Υ	N
1906+50	LP_SE	Structure on levee crown	TBD	Υ	Υ	?
1906+58	LP_DUE	Utility pole at waterside of levee crown	PG&E	Υ	Υ	Υ
1934+52	LP_WUE	36" CM pipe crossing	TBD	Υ	Υ	N
1947+33	LP_DUE	Utility pole at levee toe, 3" steel conduit crossing	TBD	Υ	Υ	N
1955+79	LP_SE	Residence on levee crown	Private	Υ	Υ	Υ
1956+00 to 1958+50	LP_SE	Farm structures on levee slopes and at levee toes	TBD	Υ	Υ	N
1957+10	ROW_DUE	Utility pole on levee slope	TBD	Υ	Υ	N
1957+90	LP_WUE	24" CM irrigation pipe crossing - abandoned	TBD	Υ	Υ	Υ
1961+11	LP_WUE	(2) 60" CM drainage pipe crossing	TBD	Υ	Υ	Υ
2014+00	LP_WUE	7" steel pipe through 12" steel pipe crossing	Private	Υ	Υ	Υ
2017+80	LP_WUE	22" reinforced concrete encased steel irrigation pipe crossing	TBD	Υ	Υ	Υ
2020+81	ROW_SE	Large steel tank at levee toe	TBD	N	Υ	N
2026+00	LP_WUE	12" reinforced concrete encased steel irrigation pipe crossing	TBD	Υ	Υ	Υ
2032+50	LP_WUE	12" reinforced concrete encased steel irrigation pipe crossing	TBD	Υ	Υ	Υ
2038+15	ROW_SE	Farm structure at levee toe	TBD	N	Υ	?
2092+20	ROW_DUE	Utility pole in close proxitmity to levee toe	TBD	N	Υ	?
2092+69	LP_DUE	Underground telephone cable crossing	TBD	Υ	Υ	N
2092+70	LP_WUE	5" irrigation pipe crossing - aluminum pipe	Private	Υ	Υ	Υ
2038+00	ROW_DUE	Utility pole in levee slope	PG&E	N	Υ	Υ
2138+80	LP_WUE	2" galvanized steel irrigation pipe crossing	Private	N	Υ	Υ

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UTILITY

REMOVAL,

Green: Addressed by SBFCA or Local Maintaining Agency over time

Black: Complies with criteria or is not impacted by levee rehabilitation work.

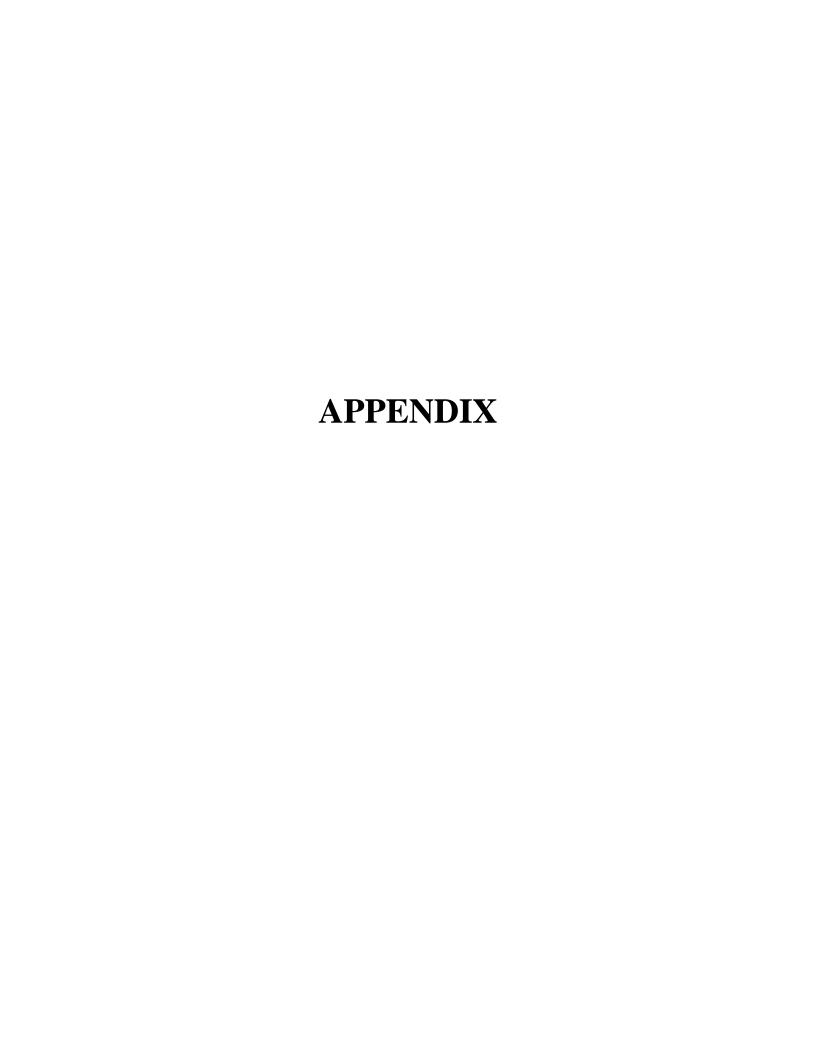
Blue: Addressed by the levee rehabilitation contractor Red: Addressed in advance of levee rehabilitation

				DISRUPTED BY LEVEE	RELOCATION, OR RETROFIT	
STATION	TYPE	DESCRIPTION	OWNER	WORK?	REQUIRED?	PERMITTED?
2142+00	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	Υ
2178+20 to 2185+50	ROW_DUE	Overhead telephone line, utility pole at levee toe	PT&T	N	Υ	Υ
2178+37	LP_WUE	16" steel irrigation pipe crossing	TBD	N	Υ	Υ
2185+20	ROW_SE	Farm structures at levee toe	Private	N	Υ	?
2201+92	LP_WUE	10" reinforced concrete encased steel pipe crossing - abandoned	TBD	Υ	Υ	Υ
2208+56	ROW_WUE	Ag well in close proximity to levee toe	Private	N	Υ	N
2208+56 to 2215+00	ROW_DUE	Overhead powerline, utility pole in close proximity to levee toe	PG&E	N	Υ	?
2239+50 to 2241+00	ROW_SE	Residence and outbuilding in close proximity to levee toe	Private	N	Υ	N
2239+56	LP-WUE	24" CM drainage pipe crossing	TBD	Υ	Υ	Υ
2243+75	ROW_SE	Outbuilding in close proximity to levee toe	Private	N	Υ	N
2244+80	LP_WUE	24" CM drainage pipe crossing	TBD	Υ	Υ	Υ
2248+70	LP_DUE	Underground telephone cable crossing	TBD	Υ	Υ	N
2250+11	ROW_SE	Concrete structure in levee slope	TBD	N	Υ	N
2250+76	LP_WUE	24" CM irrigation pipe crossing	TBD	Υ	Υ	Υ
2256+61	LP_WUE	24" reinforced concrete encased CM irrigation pipe crossing	TBD	Υ	Υ	Υ
2257+15	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
2260+90 to 2261+90	ROW_SE	Residence at levee toe	Private	N	Υ	?
2260+95	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
2261+11	ROW_DUE	Propane tank at levee toe	Private	N	Υ	N
2261+56	ROW_DUE	Propane tank at levee toe	Private	N	Υ	N
2261+60	ROW_SE	Retaining wall at levee toe	Private	N	Υ	N
2262+65	LP_WUE	24" CM drainage pipe crossing	TBD	Υ	Υ	Υ
2264+70 to 2268+45	ROW_DUE	Overhead powerline, utility poles at levee toe	PG&E	N	Υ	N
2268+27	LP_WUE	24" reinforced concrete encased CM irrigation pipe crossing	TBD	Υ	Υ	Υ
2274+56	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	N
2274+86	LP_WUE	24" reinforced concrete encased CM drainage pipe crossing	TBD	Υ	Υ	Υ
2281+00 to 2282+50	ROW_SE	Residence and driveway in close proximity to levee toe	Private	N	Υ	?
2282+25	ROW_SE	Farm structure at levee toe	Private	N	Υ	?
2282+80	ROW_DUE	Utility pole at levee toe	PG&E	N	Υ	N
2283+42	LP_WUE	24" reinforced concrete encased CM irrigation pipe crossing	TBD	Υ	Υ	Υ
2283+62	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
2352+96	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
2353+04	LP_WUE	24" CM pipe crossing	TBD	Υ	Υ	Υ
2359+05 to 2359+58	LP_SE	Sutter Butte Head Works structure	Biggs West Gridley			
			Water District	Υ	Υ	Υ
2367+90	LP_DUE	Utility pole in levee crown	TBD	Υ	Υ	?
2368+00 to 2369+70	LP_SE	Chain link fence on levee crown	TBD	Υ	Υ	?

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UTILITY

REMOVAL,



			_																			-	APP
Levee	SBFCA		SBFCA STA	Location (Northing	(NAD 83) Easting	Location Latitude	n (WGS 84) le Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of	Top of Top o	100 Yr	200 Yr	500 Yr DWR	R Permit No	Require	Year	Owner Info	Address	verified	Picture
Mile	Phase	Reach	2271 00									Pipe	Pipe Leves			1957		Permittee to Relocate	'				Taken
	D	41	2371+00 2368+00				Hamilton Bend Levee Transition End Reach 41																_
1	D	41	2365+00			Not Verified		Cutoff Wall		Struc							3930 an	d yes, cond 5	1965	Department of Water		no	no
2	D	41	2359+58	2,291,802.63	6,663,263.33	39°27'16.849"N	dike. N 121°38'24.675"W Old Sutter Butte Head Works Levee North	Cutoff Wall	Appears the structure will need to be removed and	IR(G)			138	88			504	1	part of orig	Resources Biggs West Gridley Water	r 1713 West Gridley	yes	yes
3	D	41	2359+57	2,291,800.70	0 6,663,265.27	7 39°27'16.830"N	N 121°38'24.650"W Old Sutter Butte Head Works North	Cutoff Wall	levee constructed through the area. MHM will include demo plan and levee civil will prepare plans	IR(G)			135.	34 130.33	2 131.97	137.27 132	.14		O&M 1955 part of orig	District	Road, Gridley, CA r 1713 West Gridley	yes	yes
4	D	41	2359+07	2,291,752.42			N 121°38'24.550"W Old Sutter Butte Head Works South	Cutoff Wall	for new levee.	IR(G)			135.				-	1	O&M 1955		Road, Gridley, CA	yes	yes
-	D		2359+05	2,291,752.84			N 121°38′24.919″W Old Sutter Butte Head Works Levee South	Cutoff Wall		IR(G)			138				_	-	O&M 1955	District	Road, Gridley, CA		
,		41		2,291,732.6	0,003,244.30	39 27 10.336 IN		Cuton wan		IK(O)			136.	09					O&M 1955	Biggs West Gridley Wate District	Road, Gridley, CA	yes	yes
6	D D	40/41	2359+00 2352+90	2,291,166.67	7 6,663,263.09	9 39°27'10.563"N	Reach 40/41 Transition N 121°38'24-710"W 12 kv overhead electrical power line crossing	Cutoff Wall		EL	OH		139	23						Pacific Gas & Electric	One Tower, Spear	yes	yes
				, . ,	,,,,,,																Tower, San Francisco, CA	, , ,	
7	D	40	2352+80	Not Verified	d	Not Verified	24 Inch CM pipe through levee. Concrete saddle and apron with	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)		122.7		130.08	131.75	137.03 131	.86 pre-195	5	part of orig		94105	no	no
,	ь	40	2332100	Not verifice	u	Not vernice	Calco Slide gate.	Cuton wan	requirement over 200 year WSEL. The type of pipe	SD(G)		(USED))	130.00	151.75	157.05	.00 pic-175		O&M 1955			по	no
0	D	40	2245 - 70	2 200 475 74	6 662 100 16		loi di Washington da	C + C W II	may or may not meet Title 23. Could not find, need to pothole to verify.	ID (D)	10.7	126.27	127.20 120	120.20	120.04	126.24 121	14						
s	D	40	2345+79	2,290,475.75	6,663,109.16		10 inch Iron Pipe through levee that appears to be abandoned	Cutoff Wall	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	IR(P)	12.7	126.37	127.20 139	90 129.30	130.94	136.34 131	.14					yes	yes
									may or may not meet Title 23. Could not find, need to pothole to verify.														
	D D	39/40	2319+00	Not Vonific	a	Not Vanified	Reach 39/40 Transition 24 Inch CM pipe through levee. Concrete saddle and apron with	Cutoff Wall	Not one if the similar mosts the elevation	SD(C)		124.0		124.24	125.63	122 27 127	95 105	5	mont of onio				
	D	39	2312+05	Not Verified	a	Not Verified	Calco automatic drainage gate.	Cutoff Wall	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	SD(G)		124.0 (USED)		124.25	125.63	132.37 127	7.85 pre-195	5	part of orig O&M 1955			no	no
									may or may not meet Title 23. Could not find, need to nothole to verify														
0.0-	D D	38/39 38	2303+00 2301+00	Not Verified	d	Not Verified	Reach 38/39 Transition To excavate dredger tailings from the right bank of the Feather	Cutoff Wall		Struc							1600	6 no issued	1992	Mathews Ready-mix, Inc	P.O. Box 386,		
0.3	ע	36	2301+00	inot veiille		ivot veniled	River. The tailings are to be excavated from an area approximatel	у		Suuc							1000	no issued	1992	aurews Reauy-IIIIX, Inc	Gridley, CA 95948		
	D	27/20	2202 05				100 feet landward of the landward levee toe. The application wa	S															
	D D	37/38	2290+00 2285+00				Reach 37/38 Transition Maintenance Area 07 / Hamilton Bend Levee Transition																
11.68	D	37	2283+65	2,285,659.90	0 6,661,586.51	1	24 Inch CM pipe through levee. Concrete saddle and apron with	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)	15.0	115.70	117.70 132	70 121.3	5 122.59	128.94 126	i.23 pre-195	5	part of orig			no	no
							Calco automatic drainage gate.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need										O&M 1955				
11.68	D	37	2283+44	2,285,640.25	5 6,661,593.28	39°26'15.978"N	N 121°38'46.270"W 24 Inch reinforced concrete encased CM irrigation pipe through	Cutoff Wall	to pothole to verify. The pipeline does not meet title 23 requirements and	IR(P)	17.3	113.40	115.40 132	70 121.34	1 122.58	128.93 126	i.22 pre-195	5	part of orig			yes	ves
11.00	5	3,	2203111	2,200,010.2.	0,001,000.20	3, 2013,570 1	levee. Slide Gate in 36 inch CM pipe riser on the waterside slope.		will need a positive shut-off structure installed and	11(1)	17.5	115.10	113.10	70 121.5	122.50	120.55	pic 193		O&M 1955			yes	<i>ye.</i>
							8 inch Irrigation pipe ran through existing pipe, pipe ends not exposed		automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be														
									feasible. Should be part of 30 percent but not included														
11.66	D	37	2282+57	2,285,558.49	6,661,622.35	5 39°26'15.196"N	N 121°38'45.906"W 12 kv overhead electrical power line crossing	Cutoff Wall		EL	ОН		132	97						Pacific Gas & Electric	One Tower, Spear Tower, San	yes	yes
																					Francisco, CA 94105		
11.52	D	37	2274+95	2,284,812.04	4 6,661,741.46	5 39°26'07.730"N	N 121°38'44.408"W 24 Inch CM pipe through levee. Automatic drainage gate on waterside outlet, headwall on land side inlet. Both ends of the pipe	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	SD(G)	17.8	112.30	114.30 132	11 120.83	3 122.04	128.24 125	.98 pre-195	5	part of orig O&M 1955			yes	yes
							have been cleared to operate.		automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be														
									feasible. Should be part of 30 percent but not														
5 11.52	D	37	2274+86	2,284,802.77	7 6,661,742.00	D	24 Inch CM reinforced concrete encased drainage pipe through	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)	21.8	108.30	110.30 132	10 120.83	3 122.04	128.24 125	.97 pre-195	6	part of orig			no	no
							levee. Slide Gate in 36 inch CM pipe riser on the waterside slope. Neither pipe end located or exposed.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need										O&M 1956				
5 11.39	D	37	2268+27	2,284,144.45	5 6,661,772.03	39°26'01.214"N	N 121°38'44.047"W 24 Inch reinforced concrete encased CM irrigation pipe through	Cutoff Wall	The pipeline does not meet title 23 requirements and	IR(G)	18.4	111.30	113.30 131	70 120.4	121.62	127.71 125	.78 pre-195	5	part of orig			yes	yes
							levee. Slide Gate in 36 inch CM pipe riser on the waterside slope with waterside outlet broken off and plugged.		will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.										O&M 1955				
									Pumping could be option. Should be part of 30 percent but not included														
11.33	D	37	2265+50	2,283,868.22	2 6,661,784.45	5 39°25'58.464"N	N 121°38'43.916"W 12 kv overhead electrical power line crossing	Cutoff Wall		EL	OH		131.	39						Pacific Gas & Electric	One Tower, Spear Tower, San	yes	yes
																					Francisco, CA		
3 11.28	D	37	2262+69	2,283,587.31	6,661,797.10	39°25'55.665"N	N 121°38′43.763″W 24 Inch CM drain pipe through levee with landside headwall. Automatic Drainage Gate on the waterside end with splash pan an	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	SD(G)	18.0	110.85	112.85 130.	80 120.2	121.39	127.42 125	.62 pre-195	5	part of orig O&M 1955		77.107	yes	yes
							saddle headwall.	u	automatic drainage gate on waterside of levee.										OK.W 1755				
									Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not														
11.27	D	37	2262+14	2,283,532.17	7 6,661,800.26	5 39°25'55.162"N	N 121°38'43.739"W Road Across Levee North	Cutoff Wall	included	Road			131	10						County of Butte	7 County Center	yes	yes
										<u> </u>											Drive, Oroville, CA 95965		
11.27	D	37	2261+90	2,283,505.66	6,661,801.21	39°25'54.900"N	N 121°38'43.729"W Road Across Levee South	Cutoff Wall		Road			131.	20						County of Butte	7 County Center Drive, Oroville, CA	yes	yes
11.26	D	37	2261+56	2,283,474.37	7 6,661,801.73	39°25'54.590"N	N 121°38'43.723"W Propane tank at landside toe	Cutoff Wall		1		-	130.	73	1		+	1			95965	yes	yes
11.25	D	37	2261+11	2,283,429.45		1	N 121°38'43.686"W Propane tank at landside toe	Cutoff Wall		<u> </u>			130		1		+	1			1	yes	yes
11.24	D	37	2260+55	2,283,374.22	2 6,661,809.27	7	24 Inch CM pipe through levee. Concrete saddle and apron with	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)	18.1	110.20	112.20 130.	30 120.17	7 121.35	127.37 125	.57 pre-195	5	part of orig O&M 1955		1	no	no
							Calco automatic drainage gate.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need										O&M 1955				
11.22	D	36/37	2259+00				Reach 36/37 Transition		to pothole to verify.														
11.18	D	36	2256+94	2,283,026.77	7 6,661,894.43	3	24 Inch CM pipe through levee. Concrete saddle and apron with	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)	17.1	111.00	113.00 130	10 120.10	121.29	127.29 125	.47 pre-195	5	part of orig O&M 1955			no	no
							Calco automatic drainage gate.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need										G&WI 1955				
11.17	D	36	2256+71	2,283,007.16	6,661,905.92	2 39°25'49.881"N	N 121°38'42.345"W 24 Inch reinforced concrete encased CM irrigation pipe through	Cutoff Wall	The pipeline does not meet title 23 requirements and	IR(G)	19.1	109.00	111.00 130	10 120.09	121.29	127.29 125	.46 pre-195	5	part of orig		1	yes	yes
							levee. Slide Gate in 36 inch CM pipe riser on the waterside slope. Neither pipe end located or exposed.		will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.										O&M 1955				
									Pumping could be option but not enough information available of the pump system. Should be part of 30														
11.17	D	37	2270+00			Not Verified	To construct a 50 x 100 foot walnut processing building in the rigi	ht Cutoff Wall	nercent but not included	Struc	<u> </u>	1		1	1		1278	7 yes, cond. 1:	3 1979	Rio Bonito Ranch	Route 1, Box 111,	no	no
11.05	D	36	2250+76	2,282,559.01	1 6,662,297.09		overflow area of the Feather River N 121°38'37.456"W 24 Inch CM irrigation pipe through levee. Slide gate in 36 inch	Cutoff Wall	The pipeline does not meet title 23 requirements and	IR(G)		111.50	113.50 129	90 119.9	7 121.18	127.15 125			part of orig		Biggs, CA 95917	yes	ves
11.05	י	50	ZZ50+70	2,202,337.01	0,002,297.09	5, 25 45.524 N	CM pipe riser on the waterside slope and slide gate in 48 inch RC		will need a positive shut-off structure installed and	.K(U)	10.4	111.50	113.30 129.		121.10	27.13	pic-193		O&M 1955			yes	yes
							standpipe on landside toe.		automatic drainage gate on waterside of levee. Pumping could be option but not enough information														
						2005	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		available of the pump system. Should be part of 30	<u> </u>		1			1						<u> </u>		
11.04	D	36	2250+10	2,282,509.99	6,662,339.63	39°25'45.038"N	N 121°38'36.916"W Concrete structure in waterside slope of levee Removed	Cutoff Wall		?			130	18								yes	yes

			Г	Location (NAD 83)	Location	(WGS 84)				Ī	Elevatio	ns (NGVD 198	(8) Wa	ter Surf	face Elevation	on (NGVD 1988)	CVI	PB Permit Info	rmation	Owner Inf	ormation	7	
Levee Mile	SBFCA Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe	Top of To	op of 100 evee			00 Yr DWR 1957	Permit No.	Require Permittee to	Year	Name	Address	verified	Pictur Taker
11.02	D	36	2248+30	2,282,389.90	6,662,473.42	39°25'44.066"N	121°38'35.638"W Underground telephone cable through levee at south side of paved	Cutoff Wall	Not sure if the conduit meets title 23 or 200 WSEL	TL				130.10	19.92	121.14	127.10 125.2	3	Relocate				yes	yes
10.96	D	36	2245+52	2,282,232.77	6,662,702.59)	road over levee 24 Inch CM drain pipe through levee. Automatic Drainage Gate on the waterside end buried and not located.	Cutoff Wall	Not sure if the pipeline meets the elevation	SD(G)	15.1	112.99	114.99	130.10	19.87	121.09	127.04 125.1	5 pre-1955		part of orig O&M 1955			no	no
							the waterside end buried and not located.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need to pothole to verify.											O&M 1955				
10.84	D	36	2239+66	2,281,676.83	6,662,766.65	39°25'36.688"N	121°38'31.483"W 24 Inch CM drain pipe through levee. Concrete headwall at both toes and automatic Drainage Gate in 36 inch concrete standpipe on	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	SD(G)	15.8	111.90	113.90	129.70 1	19.75	120.99	126.91 124.9	8 pre-1955		part of orig O&M 1955			yes	yes
							berm. House near land toe, land end not located it could possibly be in house back yard.		automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be											GG.W 1933				
							ili liouse back yalu.		feasible. Should be part of 30 percent but not															
10.29	D	35/36	2224+00				Reach 35/36 Transition																	
10.15	D	35	2216+71	2,280,223.64	6,663,692.84	39°25'22.387"N	121°38'19.785"W 12 Kv power line crossing of levee. One pole 215 feet water ward of levee toe with overhead clearance of 27 feet.	Cutoff Wall		EL	OH			127.30				6221	yes, cond 5	1968	Pacific Gas & Electric	One Tower, Spear Tower, San	yes	yes
10.24	D	35	2208+56	2,279,495.37	6,664,025.97	2092515 175"N	121°38'15.577"W Pump on the landside setup to pump only to land side of levee, no	Cutoff Wall		IR(G)				125.50 11	18.36	119.67	125.53 122.5	0				Francisco, CA 94105		yes
10.12		35	2201+87	2,279,440.81	6,664,690.55		standpipe, no permanent pipe over levee 121°38'07.169"W Abandoned 10 inch reinforced concrete encased steel irrigation pipe		Not sure if the abandonment meets title 23	IR(G)	13.1	111.97					124.42 122.1			part of orig			yes	ye
10.12	2		2201107	2,277,110.01	0,001,070.55	3, 23 1 1.01, 11	through levee. Slide gate in 24 inch concrete standpipe at the waterside toe. Pipe ends not located or exposed.	Culon Wan	requirements. Pipe may need to be properly abandoned or completely removed.	II(O)	13.1	111.77	112.00	123.70	. 7.30	110.00	121.12	pic 155.		O&M 1955			, , ,	,,,
9.82	D	35	2182+45	2,277,864.11	6,665,182.53	39°24'59.006"N	121°38'00.922"W Power pole at land side toe	Cutoff Wall	wandshed of completely temoved.	EL	ОН			124.34									yes	ye
9.67 -	D	34/35 34	2182+00 2178+48	2,277,831.66	6,665,565.26	39°24'58.671"N	Reach 34/35 Transition 121°37'56.047"W To replace an existing buried telephone cable with aerial cable	2138+00 to 2182+00, No Rehabilitation		EL	ОН			125.00				9076 and	yes, cond 13	1979 and	Pacific Telephone and	1426 Howe Avenue	, no	no
9.81							crossing of the right bank of the Feather River at the end of Cherry Road. The aerial telephone will be placed on an existing PG&E	Required										12663		1979	Telegraph Company	Suite 50, Sacramento, CA		
							poles. Due to two right angle bends in the levee, the overhead cable will cross the levee crown at two locations within the extension	,														95825		
9.66	D	34	2178+39	2,277,825.68	6,665,571.75	39°24'58.571"N	121°37'56.003"W 16 inch steel irrigation pipe through levee. Slide gate in 36 inch	2138+00 to 2182+00, No Rehabilitation		IR(G)	13.2	110.07	111.40	124.60 11	14.66	115.80	120.42 119.6	4 pre-1955		part of orig			yes	ye
							concrete standpipe at the waterside toe. Concrete distribution box at the landside toe.	Required	will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.											O&M 1955				
0.75		24	2120 22	2 205 150 16		2002 1122 205137	ALCOUR A ADMINISTRATION OF THE STATE OF THE	2122 00 - 2120 00 G - 6711 11	Pumping could be option but not enough information available on pump	-	OTT			100.64				50.61	1.5	10.00	D :5 G 6 F	0 7 0		
8.75	D	34	2138+22	2,275,157.46	6,664,140.19	39°24'32.295"N	121°38'14.342"W Power line crossing of levee and guy wire	2122+00 to 2138+00, Cutoff Wall		EL	OH			123.64				5865	yes, cond 5	1969	Pacific Gas & Electric	One Tower, Spear Tower, San	yes	У
8.73	D	34	2127+33	Not Verified		Not Verified	To authorize an existing 2 inch irrigation pipeline through the right	2122+00 to 2138+00, Cutoff Wall	Not sure if the pipeline meets the elevation	IR(P)	2.0	122.1		16	09.61	110.62	114.58 113.4	1 14200	yes, cond 13	1985	Clinton W. Moffitt	Francisco, CA 94105 2770 Larkin Road,	no	n
6.75	Ь	34	2127+33	Not verified		Not verified	bank of the Feather Rivers. Removable pipe over levee found at 2120+50	2122+00 to 2138+00, Cutoff Wali	requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need	IK(I)	2.0	(USED)		10	39.01	110.02	114.36	1 14200	yes, cond 13	1983	Childi W. Monte	Biggs, CA 95917	no	
8.41	D	33/34	2122+00				Reach 33/34 Transition		to nothole to verify.															
8.10	D	33				Not Verified	To plant a Kiwi vineyard parallel to the direction of river flow with	Cutoff Wall		Trees								13504	yes, cond 13	1982	Benjamin L. Couberly	7240 Suretre Lane,	no	1
7.05	D	22	2002 - 00	2 272 415 47	6 665 072 41	2002404.01483	a minimum row spacing of 4.9 meters and 2.4 meters spacing within each row.	C. c. CC W. II		777				120.52	20.00	110.00	114.56 112	0				Loomis, CA 95650		1
7.85	D D	33	2092+90	2,272,415.47	6,665,972.41	39°24'04.914 N	121°37′51.140″W Underground telephone cable through levee on north side of paved road over the top of the levee.			TL	OH				09.60	110.00	114.56 113.4	U			Parific Cas & Floatsia	One Terror Space	yes)
7.63	Б	34	2092+37				Power line crossing of levee on south side of road	2122+00 to 2138+00, Cutoff Wall		EL	On			123.64							Pacific Gas & Electric	One Tower, Spear Tower, San	yes	У
7.81	Đ	33	2092+70	Not Verified		Not Verified	5" aluminum irrigation pipe through levee. Pipeline has been	Cutoff Wall	Not sure if the pipeline meets the elevation-	IR(P)								5520	permit denied	1966	John Kucek	Francisco, CA 94105 1118 Almond	n/a	n
							removed		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need-	(-)									ļ			Avenue, Biggs, CA 95917		
7.69	D	33	2084+03	2,271,531.48	6,666,011.72	!	5" x 0.25" wall steel irrigation line through levee	Cutoff Wall	to nothole to verify. Not sure if the pipeline meets the elevation	IR(P)	2.2	116.28	116.70	118.90 10	08.96	109.98	113.96 112.7	2 17895 and	yes, cond 20	2005	John Kucek	1118 Almond	no	1
									requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need									17895-A	į.			Avenue, Biggs, CA 95917		
6.75	D	33	2037+15	2,268,425.64	6,666,455.64	39°23'25.666"N	121°37'45.190"W 115 kv pole crossing of levee.	Cutoff Wall	to nothole to verify.	EL	ОН			114.41				1290		1980	Pacific Gas & Electric	One Tower, Spear	yes	у
																						Tower, San Francisco, CA		
6.88	D	33	2032+90	Not Verified		Not Verified		Cutoff Wall	Not sure if the pipeline meets the elevation	IR(G)	14.0			10	05.35	106.23	109.77 109.6	7 pre-1955		part of orig O&M 1955		94105	no	1
							levee. Slide gate in 24 inch concrete standpipe at waterside toe.		requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need											O&M 1955				
6.74	D	33	2026+40	Not Verified		Not Verified	12 inch reinforced concrete encased steel irrigation pipe through levee. Slide gate in 24 inch concrete standpipe at waterside toe.	Cutoff Wall	to nothole to verify. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	IR(G)	13.5			10	04.72	105.59	109.10 109.3	6 pre-1955		part of orig O&M 1955			no	Г
							The control of the co		may or may not meet Title 23. Could not find, need											GG.W 1933				
6.63		33	2020+81	2,267,049.65	6,665,590.75		121°37'56.278"W Large steel tank on land side at toe of levee	Cutoff Wall	THE TRANSPORT OF THE TR					114.01				0.62		1051		25000 FI G .	yes	3
6.59	D	33	2018+00			Not Verified	To retain a spur levee between the right bank project levee and the bank of the low water channel, a distance of approximately 600	Cutoff Wall		Struc								9620	no	1974	Jack Mariani Farms, Inc.	25000 El Camino Real, Santa Clara,	no	1
							feet. The spur levee is normal to the project levee and to the direction of the overbank flow. The levee varies from 3 to 6 feet															CA 95051		
6.58	D	33	2017+78	2,266,812.83	6,665,317.53	39°23'09.770"N	121°37'59.770"W 22 inch reinforced concrete encased steel irrigation pipe through levee. Slide gate in 36 inch concrete standpipe at waterside toe.	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	IR(G)	13.9	97.87	99.70	113.60	04.08	104.92	108.35 109.0	9 pre-1955		part of orig O&M 1955			yes	3
							levee. Since gate in 30 inch concrete standpipe at waterside toe.		automatic drainage gate on waterside of levee. Pumping could be option but not enough information											O&W 1933				
									available of the pump system. Should be part of 30															
6.34	D	33	2005+20	Not Verified		Not Verified	7 inch steel pipe sleeved through the existing 12 inch steel pipe through levee. The annular space between the two pipes is plugged	Cutoff Wall	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	IR(G)	AG	101.1 (USED)		10	03.36	104.17	107.50 108.0	1 Pre-1955 and 4591	yes, cond 5	Pre-1955 for original pipe	Jack Mariani Farms, Inc.	Route 1, Box 54, Larkin Road, Biggs,	no	I
							with concrete on both ends. Slide gate in concrete risers on both		may or may not meet Title 23. Could not find, need to pothole to verify.			Ì								and 1965 for		CA 95917		
6.14	D	33	2007+00			Not Verified	To construct 1255 feet of spur levee from west project levee to the Feather River west bank.	Cutoff Wall		Struc								4963	yes, cond 5	1974	Boeger River Ranch	Route 1, Box 265, Gridley, CA	no	I
5.10- 5.15	D	33	1995+00			Not Verified	To authorize an existing walnut orchard on the right bank overflow area of the Feather River/	Cutoff Wall										15613	no	1991	William H. Cilker	16075 Matilija Drive, Los Gatos,		
5.93	D	32/33	1989+00				Reach 32/33 Transition															CA 95030		
560- 6.15	D	32	1970+00			Not Verified	To interplant trees in an existing pear orchard on the right bank overflow area of the Feather River	Cutoff Wall		Struc								6004 and	yes, cond 5	1968	W.H. Cilker	16075 Matilija Drive, Los Gatos,	no	Г
5.50	D	32	1961+03	2,264,727.12	6,660,794.20	39°22'49.332"N	121°38'57.487"W Two 60 inch CM drainpipes through levee. Automatic drainage	Cutoff Wall	The pipeline does not meet title 23 requirements and	SD(G)	20.0	85.70	90.70	110.70 10	01.68	102.54	105.86 106.1			part of orig		CA 95030	yes	,
							gates on waterside end and concrete headwalls on both ends.		will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.											O&M 1955				'
									Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not															
5.38	D	31/32	1958+00				Reach 31/32 Transition		included															H
5.44	D	31	1957+75	2,264,471.77	6,660,429.36	39°22'46.822"N	121°39′02.146″W To construct a earthen Berm, equipment storage shed, labor apartment and multiple-purpose building on the landward berm of	Cutoff Wall		Struc				110.67				5392 and 5709	yes, cond 5	1966 and 1967	William H. Cilker	16075 Matilija Drive, Los Gatos,	yes	
							the levee. The 32 foot by 34 foot building will be located adjacent to an existing shop building. The proposed building will be located											5709A		1,01		CA 95030		
					1	1	to an existing snop bunding. The proposed bunding will be located	•					1		- 1	1		1					1	1

Levee SBFCA			Location ((AD 65)	Location	(WGS 84)				Eleva	tions (NGV	D 1988)	Water S	urrace Elev	ation (NGV	D 1988)	CVFPB	B Permit Infor	mation Ov	vner Information	n		
Mile Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type co	ver Invert of Pipe	Top of Pipe	Top of Levee	100 Yr	200 Yr	500 Yr	DWR Per 1957	rmit No.	Require Permittee to	Year Name	A	Address	verified	Picture Taken
47 5.40 D	31	1956+20	2,264,512.56	6,660,422.66		24 inch CM irrigation pipe through levee. Slide gate in concrete riser pipe on landside berm. Pipe runs under mobile home.	Cutoff Wall	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	IR(G)	11.0 97.0			101.64	102.50	105.81		pre-1955	Relocate	part of orig O&M 1955			no	no
10 5 10 0		1055 10					a ew n	may or may not meet Title 23. Could not find, need to nothole to verify.															
48 5.40 D 49 5.10 D	31	1956+10	2 262 626 42	6 660 477 91	20022120 4651131	Modular Home Located on the Levee Top	Cutoff Wall		E			110.16											
	31	1947+33	2,263,626.47	6,660,477.81		121°39'01.570"W Service pole 10' from water side toe with 3" steel conduit through top of levee	Cutoff Wall		EL			110.18										yes	yes
50 4.98 D	31	1934+54	2,262,349.20	6,660,521.29	39°22'25.839"N	121°39′01.079″W 24 inch steel pipe through levee. Slide gate in concrete box on the water side slope. (Corps list pipe as 36 inch CMP)	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not	SD(G)	17.5 89.9	91.90	109.40	101.42	102.28	105.57	105.14						yes	yes
51 4.44 D	31	1906+58			Not Verified	To authorize construction of stream gauging station on the right bank levee of the Feather River	Cutoff Wall		Struc			109.76	5				5730	yes, cond 5	1967 Department of W Resources		9137, amento, CA	no	no
52 4.44 D	31	1906+58	2,259,711.16	6,661,315.13	39°21'59.734"N	121°38′51.100″W 12 kv Pole line over levee. One pole 10 foot landward and one pole on levee for DWR and service electrical to water side building	Cutoff Wall		EL	ОН		109.76	5				5857	yes, cond 5	1967 Pacific Gas & El	Tower,	Tower, Spear er, San cisco, CA	yes	yes
53 4.32 D	31	1903+96	2,259,482.14	6,661,442.38	39°21'57.465"N	121°38'49.491"W To extend 3 phase No. 4 ACSR 12 kv pole line across right bank levee of the Feather River. Line to provide power to new pump for Roy Mathews	Cutoff Wall		EL	ОН		107.72	!				5351	yes, cond 5	1966 Pacific Gas & El	Tower,	Tower, Spear er, San cisco, CA	yes	yes
54 4.30 D	31	1902+19	2,259,338.81	6,661,543.33	39°21'56.045"N	121°38′48.213″W Oroville-Gridley Highway Bridge Upstream	Cutoff Wall		Bridge			111.65	1				4123		1964 County of Butte	Drive,	unty Center e, Oroville, CA	yes	yes
55 4.3- D	31	+ +			Not Verified	Open channel on land side of levee at toe	Cutoff Wall		IR(G)											95965	i	yes	yes
5.3 4.30 D	30/31	1902+00				Reach 30/31 Transition																	
56 4.30 D	30	1901+79	2,259,317.57	6,661,574.18	39°21'55.834"N	121°38'47.821"W Oroville-Gridley Highway Bridge Downstream	Cutoff Wall		Bridge			110.16	i				4123	yes, cond 5	1964 County of Butte		unty Center e, Oroville, CA	yes	yes
57 4.25 D	30	1900+82	2,259,239.50	6,661,630.24	39°21'55.060"N	121°38'47.111"W Power pole at land side toe	Cutoff Wall		EL	ОН		106.55							Pacific Gas & El	95965 Dectric One Tower,	Tower, Spear er, San cisco, CA	yes	yes
58 4.17 D	30	1893+60	Not Verified		Not Verified	3/4 inch galvanized iron waterline through levee	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find to	WL 3.	1 rd 103.)		98.34	99.40	103.31	102.01	pre-1955		part of orig O&M 1955	94105	j	no	no
59 4.16 D	30	1893+20	Not Verified		Not Verified	6 inch concrete encased east iron sewer pipe through levee	Cutoff Wall	plans indicate they have been removed	WW 13.	9 rd 92.:	5						pre-1955		part of orig O&M 1955		+		
60 4.15 D	30	1892+60	Not Verified		Not Verified	6 inch concrete encased east iron sewer pipe through levee	Cutoff Wall	plans indicate they have been removed	WW 13.	8 rd 92.:	5					:	pre-1955		part of orig				
61 4.14 D	30	1892+20	Not Verified		Not Verified	Two 4 inch concrete encased cast iron sewer lines through the	Cutoff Wall	plans indicate they have been removed	WW(P) 1.	(USED 5 rd 93.)						pre-1955		O&M 1955 part of orig			\longrightarrow	
						levee. The Discharge end connected to the CM pump house at the landside toe of the bow levee.				(USED)								O&M 1955			ļ	
62 4.11 D	30	1892+89	2,258,542.19	6,662,052.68	39°21'49.413"N	121°38'42.751"W Pole line over the levee.	Cutoff Wall		EL	ОН		106.57							Pacific Gas & El	Tower,	Tower, Spear er, San cisco, CA	yes	yes
63 4.10 D	30	1891+25	2,258,506.36	6,662,137.72	39°21'48.132"N	121°38'42.351"W Pole line over the levee.	Cutoff Wall		EL	ОН		106.06	i .							94105	<u>i</u>	yes	yes
64 4.10 D	30	1888+70	2,258,285.10	6,662,367.26	39°21'46.416"N	121°38'39.013"W Pole Line over the levee. 1 pole 10 feet from toe.	Cutoff Wall		EL	ОН		106.32	2				5351		1966 Pacific Gas & El	Tower,	Tower, Spear er, San cisco, CA	yes	yes
65 3.38- D 4.25	30	1888+50	2,258,298.89	6,662,410.71	39°21'45.734"N	121°38'37.237"W To expand an existing waste water treatment facility on the left bank of the Feather River and to install a 6 inch force main along the right bank levee of the Feather River/	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find to	WW(P) 2.	5 rd 103.4 (USED		106.44	98.12	99.11	103.00	101.70	12103A	yes, cond 13	1979 City of Gridley		Kentucky et, Gridley, CA	yes	yes
66 3.95 D	30							worifu		O.T.		106.57										yes	yes
67 3.80 D		1887+29	2,258,210.65	6,662,463.86	39°21'44.858"N	121°38'36.548"W 12 kv power line crossing of levee	Cutoff Wall	Vento	EL	OH													
	30	1887+29 1868+17	2,258,210.65 Not Verified	6,662,463.86	39°21'44.858"N Not Verified	121°38'36.548"W 12 kv power line crossing of levee Butte County Drainage District No. 1. An 18-Inch pipe through Levee.	Cutoff Wall Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of	EL SD(G)	ОН			96.11	97.09	101.11	100.10			Butte County Dr District		unty Center e, Oroville, CA	yes	yes
68 3.35 D	30				Not Verified	Butte County Drainage District No. 1. An 18-Inch pipe through		requirements. Pipe may need to be properly				103.50	96.11	97.09 95.93			5722	yes, cond 5	District	Drive, 95965 685 Ke	e, Oroville, CA 5 Kentucky et, Gridley, CA		yes
68 3.35 D	30 30 30	1868+17	Not Verified	6,664,793.22	Not Verified 39°21'16.403"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe	Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	SD(G) WW(P) 2.	8 rd	90.00		96.11	95.93	100.03	99.20		yes, cond 5	District	Drive, 95965 685 Ke Street,	e, Oroville, CA 5 Kentucky et, Gridley, CA	yes	
	30 30 30 30	1868+17	Not Verified 2,255,332.08	6,664,793.22	Not Verified 39°21'16.403"N 39°21'07.717"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38′07.290″W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37′52.331″W 24 inch CM drainage pipe through levee. Automatic drainage gate	Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 necreen but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 necrent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	SD(G) WW(P) 2. IR (G)	8 rd		102.50	96.11 94.96	95.93 94.66	100.03	99.20	pre-1955	yes, cond 5	District 1967 City of Gridley part of orig	Drive, 95965 685 Ke Street,	e, Oroville, CA 5 Kentucky et, Gridley, CA	yes	yes
69 3.04 D		1868+17 1849+80 1834+42	Not Verified 2,255,332.08 2,254,466.85	6,664,793.22 6,665,951.72	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38′07.290″W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37′52.331″W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37′49.236″W 24 Inch CM pipe through levee. 36 inch RCP riser on the	Cutoff Wall Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	SD(G) WW(P) 2. IR (G) SD(G)	8 rd	79.60	102.50	96.11 94.96 93.69	95.93 94.66 94.43	98.93 98.68	99.20	pre-1955	yes, cond 5	District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955	Drive, 95965 685 Ke Street, 95948	e, Oroville, CA 5 Kentucky 4, Gridley, CA Kentucky 4, Gridley, CA	yes yes yes	yes
69 3.04 D 70 2.82 D	30	1868+17 1849+80 1834+42 1823+01	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39	6,664,793.22 6,665,951.72 6,666,199.22	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below	Cutoff Wall Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.	SD(G) WW(P) 2. IR (G) SD(G) WW(G)	88 rd 12.5 88.00 221.8 77.66	79.6(102.50	96.11 94.96 93.69 93.46	95.93 94.66 94.43	98.93 98.68	99.20 97.61 96.94	pre-1955 pre-1955 5722		District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955	Drive, 95965 685 Ke Street, 95948 685 Ke Street, 95948 685 Ke	Kentucky t, Gridley, CA Kentucky t, Gridley, CA Kentucky t, Gridley, CA Kentucky t, Gridley, CA	yes yes yes yes	yes yes
69 3.04 D 70 2.82 D 71 2.82 D 72 2.74 D	30	1849+80 1834+42 1823+01	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39 2,253,380.39	6,664,793.22 6,665,951.72 6,666,199.22	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below 121°37'49.236"W 12 Inch cement coated and lined steel sewer pipe sleeved through the existing 24 inch CM pipe. Annular space pressure grouted.	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible.	SD(G) WW(P) 2. IR (G) SD(G) WW(G)	88 rd 88.00 221.8 77.66	79.6(102.50	96.11 94.96 93.69 93.46	95.93 94.66 94.43	98.93 98.68 98.68	99.20 97.61 96.94	pre-1955 pre-1955 5722		District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955 1967 City of Gridley part of orig City of Gridley	Drive, 95965 685 Ke Street, 95948 685 Ke Street, 95948	Kentucky t, Gridley, CA Kentucky t, Gridley, CA Kentucky t, Gridley, CA Kentucky t, Gridley, CA	yes yes yes yes yes	yes yes yes
69 3.04 D 70 2.82 D 71 2.82 D 72 2.74 D	30 30 30	1849+80 1834+42 1823+01	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39 2,253,380.39	6,664,793.22 6,665,951.72 6,666,199.22 6,666,199.22	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N Not Verified	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below 121°37'49.236"W 12 Inch cement coated and lined steel sewer pipe sleeved through the existing 24 inch CM pipe. Annular space pressure grouted. 121°37'49.258"W 24 Inch CM pipe through levee. Slide gate in 36 inch CM riser on the waterside slope.	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible.	SD(G) WW(P) 2. IR (G) SD(G) WW(G)	88 rd 88.00 221.8 77.66	79.6(102.50	96.11 94.96 93.69 93.46 93.46	95.93 94.66 94.43	98.93 98.68 98.68	99.20 97.61 96.94	pre-1955 pre-1955 5722 pre-1955		District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955 1967 City of Gridley part of orig City of Gridley	Drive, 95965 685 Ke Street, 95948 685 Ke Street, 95948 685 Ke Street, 95948	Kentucky t, Gridley, CA	yes yes yes yes yes yes	yes yes yes yes
69 3.04 D 70 2.82 D 71 2.82 D 72 2.74 D 73 2.7- D 2.82	30 30 30 30	1849+80 1834+42 1823+01 1823+01	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39 2,253,380.39 2,252,948.28	6,664,793.22 6,665,951.72 6,666,199.22 6,666,199.22	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N Not Verified	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below 121°37'49.236"W 12 Inch cement coated and lined steel sewer pipe sleeved through the existing 24 inch CM pipe. Annular space pressure grouted. 121°37'49.258"W 24 Inch CM pipe through levee. Slide gate in 36 inch CM riser on the waterside slope. Sewer Ponds located within 30' of both toes of the levee 121°37'49.195"W City of Gridley. To install approximately 660 feet of chain link fence on the waterside toe and to authorize approximately 600 feet of 6 foot high chain link fence on the landside toe of the right bank levee of the Eeather Never Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway, located on the right within the Feather River Designated Floodway.	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible.	SD(G) WW(P) 2. IR (G) SD(G) WW(G) WW(G)	88 rd 88.00 221.8 77.66	79.6(102.50 101.40 101.40	96.11 94.96 93.69 93.46 93.46	95.93 94.66 94.43	98.93 98.68 98.68	99.20 97.61 96.94	pre-1955 pre-1955 5722 pre-1955	yes, cond 5	District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955 City of Gridley part of orig City of Gridley part of orig O&M 1955 City of Gridley	Drive, 95965 685 Ke Street, 95948	Kentucky t, Gridley, CA	yes yes yes yes yes yes yes	yes yes yes yes
69 3.04 D 70 2.82 D 71 2.82 D 72 2.74 D 73 2.7- D 2.82 74 2.70 D	30 30 30 30 30	1849+80 1849+80 1834+42 1823+01 1823+01 1818+72	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39 2,253,380.39 2,252,948.28	6,664,793.22 6,665,951.72 6,666,199.22 6,666,209.81 6,666,209.81	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N Not Verified 39°20'50.627"N	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below 121°37'49.236"W 12 Inch cement coated and lined steel sewer pipe sleeved through the existing 24 inch CM pipe. Annular space pressure grouted. 121°37'49.258"W 24 Inch CM pipe through levee. Slide gate in 36 inch CM riser on the waterside slope. Sewer Ponds located within 30' of both toes of the levee 121°37'49.195"W City of Gridley. To install approximately 660 feet of chain link fence on the waterside toe and to authorize approximately 600 feet of 6 foot high chain link fence on the landside toe of the right bank levee of the Feather River. City of Gridley. To operate a sand borrow pit and gravel borrow pit	Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 nercent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may or tome t Title 23. Could not find, need	SD(G) WW(P) 2. IR (G) SD(G) WW(G) WW(G)	88 rd 88.00 221.8 77.66	79.60	102.50 101.40 101.40	96.11 94.96 93.69 93.46 93.46	95.93 94.66 94.43 94.33	98.93 98.68 98.68	99.20 97.61 96.94 96.94	pre-1955 pre-1955 5722 pre-1955	yes, cond 5	District 1967 City of Gridley part of orig O&M 1955 part of orig O&M 1955 City of Gridley part of orig O&M 1955 City of Gridley District Part of orig O&M 1955 City of Gridley City of Gridley City of Gridley	Drive, 95965 685 Ke Street, 95948	Kentucky t, Gridley, CA Kentucky t, Gridley, CA	yes yes yes yes yes yes yes yes	yes yes yes yes yes yes
70 2.82 D 71 2.82 D 72 2.74 D 73 2.7- D 74 2.70 D 75 2.63- D 2.75 D	30 30 30 30 30	1849+80 1849+80 1834+42 1823+01 1823+01 1818+72 1816+63 1815+00 1813+70	Not Verified 2,255,332.08 2,254,466.85 2,253,380.39 2,253,380.39 2,252,948.28 2,252,738.86	6,664,793.22 6,665,951.72 6,666,199.22 6,666,209.81 6,666,209.81	Not Verified 39°21'16.403"N 39°21'07.717"N 39°20'56.968"N 39°20'56.968"N Not Verified Not Verified	Butte County Drainage District No. 1. An 18-Inch pipe through Levee. 121°38'07.290"W 18 inch cast iron sewer pipe through levee. Concrete thrust block for cutoff walls on both shoulders. Siphon breaker in concrete pipe riser on the waterside shoulder. 121°37'52.331"W 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside toe. 12 inch pipe sleeved through 24 inch pipe. 121°37'49.236"W 24 Inch CM pipe through levee. 36 inch RCP riser on the waterside slope. Same pipe as below 121°37'49.236"W 12 Inch cement coated and lined steel sewer pipe sleeved through the existing 24 inch CM pipe. Annular space pressure grouted. 121°37'49.236"W 24 Inch CM pipe through levee. Slide gate in 36 inch CM riser on the waterside slope. Sewer Ponds located within 30' of both toes of the levee 121°37'49.195"W City of Gridley. To install approximately 600 feet of chain link fence on the materside toe and to authorize approximately 600 feet of 6 foot high chain link fence on the landside toe of the right bank levee of the Feather River. City of Gridley. To operate a sand borrow pit and gravel borrow pit within the Feather River Designated Floodway, located on the right bank overflow of the Feather River.	Cutoff Wall Cutoff Wall	requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 necrent but not included. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Should be part of 30 necrent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive sub-roff structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	SD(G) WW(P) 2. IR (G) SD(G) WW(G) WW(G) Fence Struc	21.8 77.66 221.8 77.66 225.2 74.10	79.60	102.50 101.40 101.40	96.11 94.96 93.69 93.46 93.36	95.93 94.66 94.43 94.33	98.93 98.68 98.68	99.20 97.61 96.94 96.94	pre-1955 pre-1955 5722 pre-1955	yes, cond 5	District 1967 City of Gridley Part of orig O&M 1955 Part of orig O&M 1955 City of Gridley Part of orig O&M 1955 City of Gridley Part of orig Oity of Gridley City of Gridley 1989 City of Gridley Part of orig Oity of Gridley	Drive, 95965 685 Ke Street, 95948	Kentucky t, Gridley, CA Kentucky t, Gridley, CA	yes yes yes yes yes yes yes yes	yes yes yes yes yes yes

Levee	SBFCA	SBFCA	SBFCA STA	Location Northing	(NAD 83)	Location Latitude	WGS 84) Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Туре	cover	Elevation Invert of	ons (NGVD 1		Water Su	rface Eleva 200 Yr		1988) DWR P	CVFI ermit No.	PB Permit Info	rmation Year	Owner Inf	ormation Address	verified	Picture
Mile		Reach	SBICASIA	Ü	Easting						cover	Pipe		Levee	100 11	200 11		1957	erinit ivo.	Permittee to Relocate	1 cai	ivaine	Address	vermeu	Taken
7 2.55	D	29	1809+65	2,252,095.8	1 6,666,415.94	4 39°20'44.262"N	121°37'46.526"W 24 Inch CM pipe through levee. Automatic drainage gate on waterside propped open and concrete headwall on land side.	No Rehabilitation Required	The pipeline is appears to be very close to meeting the elevation requirement over 200 year WSEL. type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included.	SD(G)	4.5	94.90	96.90	101.40	93.15	94.12	98.39	96.15	pre-1955		part of orig O&M 1955			yes	yes
8 2.50-	D	29	1809+00			Not Verified	Existing Prune and Walnut Orchard on right bank overflow area of the Feather River	No Rehabilitation Required		Trees									7782	yes, cond 13	1971	W.L. Boyd	Route 1, Box 578, Gridley, CA 95948	no	no
9 2.35	D	29	1799+44	2,251,083.5	4 6,666,333.91	39°20'34.260"N	121°37'47.640"W 8"x .25" thick wall with exterior taped wrapped to a minimum thickness of 30 mil. The irrigation pipeline irrigation pipeline through levee	No Rehabilitation Required	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to	IR(P)	2.1	97.83	98.50	100.60	92.87	93.83	98.12	95.58	17213	yes, cond 35	2000	Robert C. Waller	585 Cowee Avenue Gridley, CA 95948	yes	yes
0 2.20	D	29	1792+96	2,250,482.0	0 6,666,094.79	39°20'28.324"N	121°37'50.715"W Abandoned 24 inch CM drainage pipe through levee. Automatic drainage gate on waterside and concrete distribution box at waterside toe. Land side end of the pipe is not located	No Rehabilitation Required	verify. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Meets 30 percent	SD(G)	10.2	87.40	89.40	99.60	92.50	93.47	97.81	95.17	pre-1955		part of orig O&M 1955			yes	yes
1 2.11- 2.50	D	29	1790+00			Not Verified	To authorize leveling and planting walnut and peach orchard on right overflow area of Feather River	No Rehabilitation Required	design criteria not included	Trees									6622	no	1973	Robert C. Waller	585 Cowee Avenue Gridley, CA 95948	no	no
2 2.10	D	29	1785+55	Not Verifie	d	Not Verified	24 Inch CM drain pipe through levee. Concrete Headwall at land side. Automatic Drainage Gate on waterside with splash pad.	No Rehabilitation Required	The pipeline is appears to be very close to meeting the elevation requirement over 200 year WSEL. type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included.	SD(G)				100.00	92.05	93.04	97.50	94.89	pre-1955		part of orig O&M 1955			yes	yes
3 2.10	D	29	1785+24	2,249,771.6	7 6,665,793.11		24 Inch CM drain pipe through levee. Concrete Headwall at land side. Automatic Drainage Gate on waterside with splash pad.	No Rehabilitation Required	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Could not find, need	SD(G)	5.7	92.30	94.30	100.00	92.04	93.03	97.49	94.88	pre-1955		part of orig O&M 1955			no	no
4 1.94	D	29	1777+00	2,249,094.5	7 6,665,330.01	39°20'14.641"N	121°38′00.521″W 24 Inch CM drain pipe through levee. Concrete Headwall at land side. Automatic Drainage Gate on Waterside.	No Rehabilitation Required	to nothole to verify. The pipeline is appears to meet the elevation requirement over 200 year WSEL. type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included.	SD(G)	4.5	93.40	95.40	99.90	91.71	92.71	97.27	94.72	pre-1955		part of orig O&M 1955			yes	yes
5 1.77- 2.12	D	28	1770+00			Not Verified	To authorize existing walnut trees, located on the right bank of the Feather River.	Address Sutter Butte Main Canal. Rehabilitation Work TBD		Trees									12388	yes, cond 13	1978	Robert Waller	Route 1, Box 920, Gridley, CA 95948	no	no
1.79 6 1.76	D D	28/29	1769+31 1767+67	2,248,176.5	3 6,665,251.10	39°20'05.570"N	Reach 28/29 Transition 121°38'01.573"W Cox Spillway. North 60 Inch drain pipes through Levee. Slide	Address Sutter Butte Main Canal.	The pipeline does not meet title 23 requirements and	SD(G)	8.4	86.70	91.70	100.10	91.31	92.33	97.02	94.54	pre-1955		part of orig	Butte Water District,	735 Virginia Street,	yes	yes
				-,	,,,,,		Gates in 78 inch CM pipe wells on the waterside slope. Concrete bulkhead on both ends. Reinforced concrete spillway at the waterside end.	Rehabilitation Work TBD	will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not included.	32(0)						,			P 200			Sutter Extension Water District	Gridley, CA 95948	,	,
7 1.76	D	28	1767+57	2,248,167.2	2 6,665,252.49	39°20'05.478"N	121°38′01.556″W Cox Spillway, South 60 Inch drain pipes through Levee. Slide Gates in 78 inch CM pipe wells on the waterside slope. Concrete bulkhead on both ends. Reinforced concrete spillway at the waterside end.	Address Sutter Butte Main Canal. Rehabilitation Work TBD	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent but not	SD(G)	8.4	86.70	91.70	100.10	91.31	92.33	97.02	94.53	pre-1955			Butte Water District, Sutter Extension Water District	735 Virginia Street, Gridley, CA 95948	yes	yes
8 1.72- 1.75	D	28	1767+30	2,248,140.7	7 6,665,254.84	39°20′05.217″N	121°38′01.527°W To construct an 12kv aerial power line crossing of the right bank levee of the Feather River. The power line will extend from an existing pole located landward of the project levee to a new 50 foot pole located at least 20 feet water ward of the water ward too of the levee/ The shall be 34 feet of clearance between the levee crown and the power line. The length of the span shall be 201 feet. The power line will extend from the 50 foot poles to a 30 foot pole to be located 135 downstream. This power line shall serve a pump covered by permit 11987 b Cox Brothers.	Address Sutter Butte Main Canal. Rehabilitation Work TBD		EL	OH			100.33					12020	yes, cond 13	1977	Pacific Gas and Electric Company	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
9 1.71	D	28	1766+00			Not Verified	To construct, operate, and maintain a 12kv aerial power line extension across the right bank levee, channel, and left bank overflow of the Feather River. A 55 foxt pole will be installed 31 feet water ward of the water ward shoulder of levee. The overhead conductors will extend from an existing pole, located 138 feet landward of the landward toe of levee, the proposed 55 pole. The span between the two poles will be 212 feet. A minimum clearance of 35 feet will be provided between the overhead conductors and the top of the levee. The proposed extension will extend across the river and floodway for an additional 3,165.5 feet and will consist of	Address Sutter Butte Main Canal. Rehabilitation Work TBD		EL	OH			100.33					12241	yes, cond 13	1977	Pacific Gas and Electric Company	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
0 1.71	D	28	1765+33	2,247,975.9	4 6,665,181.76	39°20′03.574″N	121°38′02.510″W 12-inch CM pipe through the Levee. Slide Gate on the landside end and concrete distribution box on waterside.	Address Sutter Butte Main Canal. Rehabilitation Work TBD	The pipeline does not appear to meet the elevation requirement over 200 year WSEL. Type of pipe appears to meet Title 23. We will need a positive shut off structure installed and automatic drainage gate on	IR(G)	4.5	94.50	95.50	100.00	91.03	92.09	96.90	94.55			1979	Cox Bros	Route 1, Box 926, Gridley, CA 95948	yes	yes
1 1.70	D	28	1765+15	2,247,960.4	4 6,665,189.22	2 39°20′03.424″N	121°38′02.404″W To install an irrigation pump on the right bank of the Feather River with a 12 inch steel pipe across the berm, levee, and the Sutter Butte Canal to existing orchards on the right bank downstream from Evans-Reimer Road. Concrete headwall at the waterside toe	Address Sutter Butte Main Canal. Rehabilitation Work TBD	waterside of levee The pipeline is appears to meet the elevation requirement over 200 year WSEL. Type of pipe might not meet Title 23. We will need a positive shut- off structure installed and automatic drainage gate on waterside of levee.	IR(P)	0.7	98.50	99.50	100.20	91.02	92.08	96.90	94.55	11987	yes, cond 13				yes	yes
2 1.55	D	28	1756+27	2,247,101.4	0 6,665,410.42	39°19'54.940"N	121°37'59.617"W Abandoned 12-inch CM pipe through the Levee. Slide Gate on the landside end and concrete distribution box on waterside.	Address Sutter Butte Main Canal. Rehabilitation Work TBD	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	SD(G)	7.1	90.67	91.67	98.80	90.74	91.82	96.71	94.29						yes	yes
3 1.5- 1.60	D	28	1753+50			Not Verified	To plant approximately 1.13 hectares of kiwi plants and install an irrigation system supplied by an existing water well.	Address Sutter Butte Main Canal. Rehabilitation Work TBD	abandoned or completely removed.	Trees									13410	yes, cond 13	1982	Edwin Roach	955 East Evans Reimer Road,	no	no
4 1.45- 1.50	D	28	1753+50			Not Verified	To install a n electrical pole line service extension to a new agricultural pump on the right bank overflow area of the Feather	Address Sutter Butte Main Canal. Rehabilitation Work TBD		EL	ОН								13436	yes, cond 13	1982	Pacific Gas & Electric	Gridlev. CA 95948 5555 Florin-Perkins Road, Sacramento,	no	no
5 1.30	D	28	1745+00			Not Verified	River To retain a newly constructed barn on the right bank overflow area of the Feather River, approximately 150 feet water ward of the right	Address Sutter Butte Main Canal. Rehabilitation Work TBD		EL	ОН								10823	no	1975	W.W. Alexander	CA 95826 Route 1, Box 718, Gridley, CA 95948	no	no
6 1.27	D	28	1741+32	2,245,620.9	8 6,665,550.58	39°19'40.299"N	bank levee of the Feather River 121°37'57.893"W Butte County Drainage District No. 1. A 16-Inch pipe through Levee. Emergency Repair Work on Pipe 3/5/02. Pipe not physically located	Address Sutter Butte Main Canal. Rehabilitation Work TBD	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	SD(G)	9.0	87.00	89.00	97.77	90.28	91.38	96.38	93.85				Butter County Drainage District No. 1	7 County Center Drive, Oroville, CA 95965	yes	yes
7 1.00	D	28	1728+33	2,244,365.9	8 6,665,826.21	39°19'27.883"N	121°37'54.450"W To install a 12kv pole line westerly across the right bank levee of the Feather River and the Sutter Butte Canal, then northerly	Address Sutter Butte Main Canal. Rehabilitation Work TBD	feasible	EL	ОН								13359	yes, cond. 13	1982	Pacific Gas & Electric Company	5555 Florin-Perkins Road, Sacramento,	yes	yes
8 0.94	D	28	1724+61	2,244,008.4	6 6,665,796.35	5 39°19'24.351"N	approximately 180 meters for service to well numn. 121°37'54.848"W 12 kv overhead electrical power line and telephone line crossing	Address Sutter Butte Main Canal.		EL	ОН			97.77								-ompany	CA 95826	yes	yes
9 0.62-	D	28					1800 feet of 4.5 foot tall barbed wire fence located at waterside toe	Rehabilitation Work TBD Address Sutter Butte Main Canal.						+					17271			Peckema Bros			
0.90		27/28	1721+60				of levee. Reach 27/28 Transition	Rehabilitation Work TBD																	
0.90	D	27	1721+20	2,243,713.9	9 6,665,636.50	39°19'21.446"N	121°37'56.897"W End 18" wide, 12-25 feet deep cutoff wall on crown with monitoring system 2000 lineal feet.	Address Sutter Butte Main Canal. Rehabilitation Work TBD				Ţ		96.10					Ţ			The Research Foundation of CSU Chico		yes	yes

			Г	Location ((NAD 83)	Location	(WGS 84)					Elevati	ions (NGVD 1	1988)	Water Su	ırface Eleva	tion (NGVD 1988	CV	FPB Permit Inf	ormation	Owner Inf	ormation	1	
Levee Mile	SBFCA Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe	Top of			200 Yr	500 Yr DWF 1957	Permit No	. Require Permittee to	Year	Name	Address	verified	Picture Taken
0.78	8 D	27	1707+34	2,242,329.23	6,665,666.71	39°19'07.758"N	121°37'56.584"W Begin 18" wide, 12-25 feet deep cutoff wall on crown with	Address Sutter Butte Main Canal.						96.80					Relocate		The Research Foundation	1	yes	yes
0.77	7 D	26/27	1707+11				monitoring system 2000 lineal feet. Reach 26/27 Transition	Rehabilitation Work TBD													of CSU Chico			
0.46	5 D	26	1699+62	2,241,637.34	6,665,378.46	39°19'00.931"N	121°38'00.288"W Propane storage tanks at waterside toe of levee	Address Sutter Butte Main Canal. Rehabilitation Work TBD		G				97.13									yes	yes
0.44	4 D	26	1697+96	2,241,496.45	6,665,289.21	39°18'59.542"N	121°38′01.430″W To retain a telephone line aerial crossing of the right bank levee of	Address Sutter Butte Main Canal.		TL	OH			97.58				1042	2 no	1975	Pacific Telephone and	1426 Howe Avenue	, yes	yes
							the Feather River. The aerial telephone line extends from a pole located landward of the Sutter Butte Main Canal to a pole located near water ward fore of the levee	Rehabilitation Work TBD													Telegraph Co.	Suite 50, Sacramento, CA		
0.40) D	26	1695+85			Not Verified	To construct a caretaker/ranch office and remove an existing structure on the right bank designated floodway of the Feather	Address Sutter Butte Main Canal. Rehabilitation Work TBD		Struc								1589	l no	1992	J.F. Desmond	P.O. Box 211, Gridley, California		
0.30	D	26	1691+00			Not Verified	River. To authorize farm buildings (a walnut processing plant and shop) on the water ward toe of the right bank levee on the Feather River,	Address Sutter Butte Main Canal. Rehabilitation Work TBD		Struc								1196	3 yes, cond. 13	1977	J.F. Desmond	P.O. Box 211, Gridley, California		
							200 feet north of Chandon Avenue. The buildings are a 30 x 80 foot walnut dehydrator and a 40 x 40 shed.															95948		
0.00- 0.53	D	26	1690+00			Not Verified	To level and plant 160 acres of land between right bank levee and Feather River, off end of Chandon Avenue and opposite mouth of Honcut Creek	Address Sutter Butte Main Canal. Rehabilitation Work TBD		Trees								656	6 yes, cond 5	1969	Butte Farms, Inc.	P.O. Box 338, Gridley, CA 95948		
0.01	l D	26	1675+98	2,239,584.22	6,664,224.05	39°18'40.683"N	121°38'15.081"W 12 kv power line crossing of levee	Address Sutter Butte Main Canal. Rehabilitation Work TBD		EL	ОН			96.20				369	2 yes, cond 5	1961	Pacific Gas and Electric Company	530 E Street, Marysville, CA	yes	yes
0.00	D	26	1675+50				Maintenance Area 16/ Maintenance Area 7 Transition															95901		
1 4.09	D	26	1675+27	2,239,518.21	6,664,204.12	39°18'40.036"N	121°38'15.340"W Butte County Drainage District No. 1. 60" x 72" RCP culvert through levee. Slide gate in concrete well on waterside slope.	Address Sutter Butte Main Canal. Rehabilitation Work TBD	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	SD(G)	17.0	73.90	78.90	95.90	87.76	89.02	94.62 91	42 pre-195	5		Butter County Drainage District No. 1	7 County Center Drive, Oroville, CA	yes	yes
							infought evee. Since gate in concrete wen on waterside stope.	Renamination work 15D	automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be											O&W 1933	District No. 1	95965		
	D	25/26	1674+37				Reach 25/26 Transition		feasible															
2 3.9-		25	1670+00			Not Verified	To plant kiwi plants in place of fruit and nut trees on the right bank overflow of the Feather River south of Chandon Avenue near Live	No Rehabilitation Required		Trees								1220	0 yes, cond 13	1981	Lois Scoonmaker	1424 Mirada, Yuba City, CA 95991	no	no
3.94		25	1667+00			Not Verified	Overflow of the Feather River south of Chandon Avenue near Live Oak. To clear the overflow area of brush and construct a foot bridge over	No Rehabilitation Required		Struc	1							743	8 yes, cond 13	1971	Grover James	925 N. Rancho	no.	no
3.90		23	1007+00			Not verified	an old channel that meanders across the overflow area. To install a septic tank and leach lines, electric service, drill a well and park a	No Renaomitation Required		Struc								743	8 yes, cond 13	1971	Grover James	Road, El Sobrante, CA 94803	no	по
4 3.85	5	25	1665+32	2,238,525.15	6,664,192.56	39°18'30.216"N	mobile home in the overflow area 121°38'15.536"W To construct a 12 kv aerial power line extension across the levee	No Rehabilitation Required		EL	OH			95.67				710	l yes, cond 5	1970	Pacific Gas and Electric	530 E Street,	yes	yes
							and into the floodway of the Feather River. An existing pole on the landside of the levee will be replaced with a new 55 foot pole to be														Company	Marysville, CA 95901		
							located 13 feet from the landward toe of the levee. The overhead conductors will extend across the levee to a 55 foot pole located in			1	1										1			
							the floodway 140 feet from the waterside toe of the levee. The spar between the 2 poles will be 233 feet. A minimum clearance of 31	1														1		
3.65	5	25	1653+15	2,237,309.20	6,664,181.79	39°18'18.198"N	121°38'15.734"W 12 Kv overhead power line crossing and along levee	No Rehabilitation Required		EL	OH			95.17							Pacific Gas & Electric	One Tower, Spear	yes	yes
										1	1											Tower, San Francisco, CA		
3.41-		25	1650+00			Not Verified	To retain a walnut orchard on the right bank overflow area of the	No Rehabilitation Required		Trees								1185	5 yes, cond 13	1976	Madsen Ranch	94105 P.O. Box 134, Live	no	no
3.73							Feather River. The orchard is located a narrow strip of ground between the project levee and Drainage District No. 1's drain ditch.															Oaks, CA 95953		
3.39	9	25	1639+00	2,235,906.77	6,664,006.17	39°18′04.327″N	121°38′17.999°W RD 777 Lateral 11. There are 2-24 inch steel pipes through levee. Automatic drainage gates on waterside end of pipe.	No Rehabilitation Required	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	SD(G)	16.2	78.40	80.40	94.60	87.19	88.46	94.09 90	91 pre-195	5	part of orig O&M 1955	Reclamation District No. 5 777	P.O. Box 876, Gridley, CA 95948	yes	no
3.38	3	25					Construction of Waterside Approach Ramp 500 feet north of	No Rehabilitation Required	feasible		1				+			301	9 yes, cond 4	1959	Peder Pederson	Route 1, Box 33,	yes	no
3.38	3	25	1638+72	2,235,879.28	6,664,006.22	39°18'04.071"N	Campbell Road and Meader Road 121°38'18.040"W 12 Kv overhead power line crossing and along levee	No Rehabilitation Required						94.50								Live Oak, CA	yes	yes
3.14-		25	1635+00			Not Verified	To plant a prune orchard on the right bank overflow area of the	No Rehabilitation Required										861	6 yes, cond 13	1973	James Eva	11751 Meteer Road	no	no
3.39							Feather River at the end of Riviera Road															Live Oak, CA 95953		
2.87	C 7 C	24/25	1623+86 1610+92	2,233,196.84	6 664 513 54	20°17'27 510"N	Reach 24/25 Transition 121°38'11.755"W RD 777 Lateral 12. An 18 inch CM pipe through levee. Automatic	Cutoff Wall and averages and place 4.5	The pipeline does not most title 22 requirements and	SD(C)	17.3	76.50	78.00	93.80	97.00	88.28	93.90 90	69 pre-195	5	part of orig	Reclamation District No.	P.O. Por 976	Trac	1100
2.0		24	1010+92	2,233,170.64	0,004,313.34	39 17 37.319 N	drainage gate on waterside end of pipe.		will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	3D(G)	17.3	70.30	78.00	93.80	87.00	66.26	93.90 90	09 pie-193	3	O&M 1955	777	P.O. Box 876, Gridley, CA 95948	yes	yes
2.83	3 C	23/24	1609+37				Reach 23/24 Transition		feasible															
2 2.38	3 C	23	1585+05	Not Verified	1	Not Verified	Abandoned 12 inch CM pipe through levee. Automatic drainage	Cutoff Wall	Not sure if the abandonment meets title 23	?		86.4			86.21	87.54	93.24 89	74 pre-195	5	part of orig			no	no
							gate on waterside end of pipe		requirements. Pipe may need to be properly abandoned or completely removed. Could not find			(USED)								O&M 1955	5			
1.83	3 C	23	1557+00			Not Verified	To add approximately 575 feet of 12 kv line to an existing power line on Cooley Road and within the overflow area of the Feather	Cutoff Wall		EL	ОН			92.80				1279	2 yes, cond. 13	1971	Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento, CA 95826	no	no
1.83	3 C	23	1556+58	2,228,785.42	2 6,665,751.32	39°16'53.885"N	121°37'56.205'W To extend a 12 kv pole line from the intersection of Cooley Road and the right bank levee of the Feather across the levee and	Cutoff Wall		EL	ОН			92.80				733	6 yes, cond. 13	1971	Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento,	yes	yes
							continue for 1500 feet easterly along Cooley Road. The pole line will serve a 25 HP river numn														1	CA 95826		
1.83	3 C	23	1556+22	2,228,750.17	6,665,741.92	:	8 inch CM pipe through levee. Automatic drainage gate on waterside end of pipe. (No gate found, ARV on land side by structure. Line may be to the north pump plant from permit 7380)	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find to	IR(P)	8.0	81.0 (USED)		92.80	85.09	86.54	92.64 89	01 pre-195	5	part of orig O&M 1955			no	no
1.80) C	23	1555+00			Not Verified	To install pumping plants at two locations on the right bank of the	Cutoff Wall	verify	IR(P)	-			+	+			738	0 yes, cond 13	1971	William Filter, Jr.	Route 2, Box 9,	no	no
1.71	l C	23	1549+63	2,228,117.97	6,665,558.67	,	Feather River 12 inch CM pipe through levee. Automatic drainage gate on	Cutoff Wall	Not sure if the abandonment meets title 23	SD(G)	12.5	79.05	80.05	92.50	85.05	86.51	92.61 88	91 pre-195	5	part of orig		Chico, CA 95926	no	no
							waterside end of pipe. Pipe partially plugged		requirements. Pipe may need to be properly abandoned or completely removed. Could not find											O&M 1955	5			
1.30- 1.83	С	23	1548+00			Not Verified	To level and plant walnuts and either peaches or prunes on the right bank overflow area of the Feather River upstream from Live	Cutoff Wall		Trees								699	yes, cond 5	1970	William Filter, Jr.	Route 2, Box 9, Chico, CA 95926	no	no
1.50	C	23	1539+00			Not Verified	Oak Park. To install 25 HP pumping plants at two locations on the right bank of the Feather River	Cutoff Wall		IR(P)	1							738	0 yes, cond 13	1971	William Filter, Jr.	Route 2, Box 9, Chico, CA 95926	no	no
1.45	5 C	23	1536+12	2,226,796.70	6,665,666.06	39°16'34.268"N	121°37′57.407″W RD 777 Lateral 7. There is a 36 inch CM pipe through levee. Automatic drainage gate on waterside end of pipe.	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be	SD(G)	13.7	75.65	78.65	92.32	84.94	86.40	92.52 88	68 pre-195	5	part of orig O&M 1955	Reclamation District No. 5 777		yes	yes
1.45	5 C	23	1535+95	2,226,780.47	6,665,668.20	39°16'34.070"N	121°37′57.365″W To extend a 12 kv pole line 410 feet northerly to supply a 25 HP pump located in the river. The pump is pump referenced in permit	Cutoff Wall	feasible	EL	ОН			92.39				733	5 yes, cond 13	1971	Pacific Gas and Electric Company	Road, Sacramento,	yes	yes
1.44	4 C	23	1535+64	2,226,750.14	6,665,678.35	39°16'33.770"N	7380. 121°37'57.237"W To widen access road to Live Oak Recreation Area at the east end of Pennington Road on the right bank levee and berm of the Feather	Cutoff Wall		Struc								729	4 yes, cond 5	1971	County of Sutter	CA 95826 1160 Civic Center Blvd, Yuba City,	yes	yes
1.40) C	23	1535+00			Not Verified	River To Install 2500 If of 2 inch diameter Sch 40 PVC water pipe and	Cutoff Wall		W(P)				+	+			1825	6 yes, cond 24	2007	County of Sutter	CA 95993 1130 Civic Center		
					1	1	600 If of 1 inch Sch 40 PVC pipe within the west bank overflow. (Permit number has been changed to 7440-D)	1	1	1	1	1		1							1	Blvd, Yuba City,	1	

Levee	SBFCA	SBFCA	SBFCA STA	Location (Northing	NAD 83) Easting	Location (Latitude	(WGS 84) Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Elevation Invert of	ns (NGVD 1988) Top of Top of		200 Yr	500 Yr DWR	CVFI Permit No.	PB Permit Infor Require	mation Year	Owner Info Name	Address	verified	Picture
Mile	Phase	Reach			8							Pipe	Pipe Levee			1957		Permittee to Relocate					Taken
1.36- 1.39	С	23	1534+00			Not Verified	To construct a water supply system, a sanitary disposal system and restrooms for the Live Oak Recreational Area	Cutoff Wall		Struc							6855	yes, cond 5	1969	County of Sutter	1130 Civic Center Blvd, Yuba City, CA 95993		
5 1.36	С	23	1532+40	Not Verified		Not Verified	Potential Pipe Crossing. 6" Steel through levee	Cutoff Wall	Not sure about the elevation criteria being met. The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	?		82.2 (USED)	91.	84.80	86.27	92.41 88.56	pre-1955		part of orig O&M 1955		CA 95995	yes	yes
5 1.36	С	23	1532+45	2,225,437.02	6,665,722.95	39°16'20.789"N	121°37'56.738"W Pump Station adjacent to Levee	Cutoff Wall	automatic drainage gate on waterside of levee	IR(P)							7380	yes, cond 13	1971	William Filter, Jr.	Route 2, Box 9, Chico, CA 95926	yes	yes
7 1.33- 1.43	С	23	1530+00			Not Verified	Live Oak Park to authorize trailer site, a porch, a metal storage building, fence across the waterside berm and waterside slope of the levee, on the right bank of the overflow area of the Feather River.	Cutoff Wall		Struc							7440	yes, cond 13	1973	County of Sutter	1160 Civic Center Blvd, Yuba City, CA 95993	no	no
8 1.17	С	23	1524+35	Not Verified		Not Verified	Potential Pipe Crossing. 6" Steel through levee	Cutoff Wall	Not sure about the elevation criteria being met. The pipeline does not meet title 23 requirements and will	?		80.1 (USED)	91.	84.27	85.80	92.05 87.89	pre-1955		part of orig O&M 1955			yes	yes
0.75	C	22/22	1502.92				Book 2202 Tourising		need a positive shut-off structure installed and automatic drainage gate on waterside of levee														
9 0.50-	C	22/23	1503+83 1530+00			Not Verified	Reach 22/23 Transition To authorize existing pear orchard and plant 10 additional acres on	Cutoff Wall		Trees							12672	yes, cond 13	1980	Elvyn Denny	2034 Fir Street,	no	no
0.70-	С	22	1520+25			Not Verified	the right bank overflow of the Feather River downstream of Archer Road To extend approximately 1,950 feet of 12kv electric service line in	Cutoff Wall		EL	ОН						12824	yes, cond 13	1979	Pacific Gas and Electric	Live Oak, CA 95953 P.O. Box 7444,	no	no
1.14	C	22	1493+88	2,222,717.57	6,664,731.41		the right bank overflow area of the Feather River downstream from Archer Avenue crossing Location of gate with no access	Cutoff Wall		Fence			91.	4			17139	yes, cond 16		Company	Sacramento, CA 95826	yes	yes
2 0.47		22	1492+00	2,222,717.37	0,004,731.41	Not Verified	To construct an aerial telephone crossing of the right bank levee of	Cutoff Wall		structur			71.	-			6256	yes, cond 5	1969	Pacific Telephone and	3675 "T" Street,	no	no
3 0.42-	С	22	1482+00			Not Verified	the Feather River To authorize a 4 x 17 foot wooden walkway on the landside	Cutoff Wall		e structur							17139	yes, cond 15	1999	Telegraph Company Wayne Sue	Sacramento, CA P.O. Box 213, Live	yes	yes
.47							shoulder; two tool sheds, four walnut trees, a barbed wire and wooden fence within 10 feet landward of the landside toe, and an electrical gate across the crown of the right bank levee of the			e											Oak, California 95953		
4 0.38	С	22	1479+98	2,221,343.18	6,664,540.45	39°15'40.364"N	Feather River 121°38′09.549″W Location of electric gate with no access	Cutoff Wall		Fence			91.	4			17139	yes, cond 16				yes	yes
5 0.19	С	22	1470+15	2,220,360.26	6,664,561.50	39°15'30.656"N	121°38′11.766″W To authorize a 4 x 17 foot wooden walkway on the landside shoulder and a 6 x 300 foot wooden lattice fence within 10 feet landward of the landside toe and parallel to the right bank of levee	Cutoff Wall		structur e							17168	yes, cond 15	1999	Mariko Gushi	1320 Bishop Road, Live Oak, CA 95953	yes	yes
6 0.15	С	22	1468+70			Not Verified	of Feather River To authorize four trees (oleander, pines, cherry, and birch) on the landside slope and a 5 foot high, 170 foot long wire fence within 7 feet of landward of the landside toe of the right bank levee of the Feather River	Cutoff Wall		structur e							17129	yes, cond 14	1999	Kevin and Mary Ann McCool	1210 Bishop Road, Live Oak, CA 95953	no	no
7 0.10		22	1466+02	2,219,947.02	6,664,564.97		121°38'11.743"W Transformer located 40'± from land side toe	Cutoff Wall		EL			95.	16								yes	yes
8 0.10	С	22	1465+50			Not Verified	To construct access ramp across the right bank levee of the Feather River	Cutoff Wall		Struc							4741	yes, cond 5	1964	Edward J. Heinrich	2434 Archer Avenue, Live Oak, CA 95953	no	no
0.10	€	22	1465+50			Not Verified	The existing 36 inch CMP installed in 1913 failed on March 1964. The permit was for repair of levee and removal of the pipe prior to November 1961.	Cutoff Wall		IR(G)	Y.	57.7 (USED, Vaterside) 70.0, USED,					4556 and 4719	yes, cond 5	1964 and 1965	Butte Water District, Sutter Extension Water District	735 Virginia Street, Gridley, CA 95948	no	no
0.00-	С	22	1461+00			Not Verified	To maintain existing your walnut orchards on the right bank of the Feather River, downstream from Bishop Avenue.	Cutoff Wall		Trees		andward)					11762	yes, cond 13	1976	Edward J. Heinrich	2434 Archer Avenue, Live Oak, CA 95953	no	no
5.72	С	22	1460+00				Levee District No. 9 Levees /Maintenance Area 16 Transition														C. 17.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7		
1 5.67	С	21/22	1433+83 1430+55	2,216,425.27	6,664,383.06	39°14'51.685N	Reach 21/22 Transition 121°38'14.253"W Sunset Pump Station owned an operated by Sutter Extension Main	Cutoff Wall	The pipeline does not meet title 23 requirements and	IR(P)	15.6	80.61	85.61 91.	6 81.70	83.63	90.27 85.74	pre-1955	yes, cond 5 (for		Sutter Extension Water	4525 Franklin	yes	yes
							Pump Station. This is the 60 Inch steel pipe a through the levee. Pump end has gate valves on structure. Automatic drainage gates on the landside end.		will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible.								and 3610	pumps)	O&M 1955 and 1961	District	Road, Yuba City, CA 95993-9316		
2 5.67	С	21	1430+47	2,216,417.64	6,664,382.64	39°14'51.614N	121°38'14.261"W Sunset Pump Station owned an operated by Sutter Extension Main Pump Station. This is the 60 Inch steel pipe a through the levee. Pump end has gate valves on structure. Automatic drainage gates on the landside end.	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible.	IR(P)	15.6	80.42	85.42 91.	3 81.70	83.63	90.27 85.74	pre-1955 and 3610	yes, cond 5 (for pumps)	part of orig O&M 1955 and 1961	Sutter Extension Water District	4525 Franklin Road, Yuba City, CA 95993-9316	yes	yes
5.67	С	21	1430+40	2,216,410.86	6,664,382.27	39°14'51.758N	121°38'14.247"W Sunset Pump Station owned an operated by Sutter Extension Main		The pipeline does not meet title 23 requirements and	ID/D)	15.6	82.92	85.92 91.	8 81.70	83.63	90.27 85.74		1 F (C		Sutter Extension Water	4525 Franklin	yes	yes
4 5.67							Pump Station. This is the 36 inch steel pipe through the levee. Pump end has gate valves on structure. Automatic drainage gates on the landside end.	Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible.	IK(P)		02.72	83.92 91.	81.70			and 3611	yes, cond 5 (for pumps)	O&M 1955 and 1961		Road, Yuba City, CA 95993-9316		
	С	21	1430+40			Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located	Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over	IR(P)		02.72	63.72 71.	81.70			and 3611		O&M 1955		CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA	no	no
5 5.67		21 21	1430+40	Not Verified		Not Verified Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with		will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find			32.72	63.72 91.	01.70				pumps)	O&M 1955 and 1961	District	CA 95993-9316 1701 Nimbus Road,	no	no no
	C		1430+40	Not Verified 2,216,368.25	6,664,376.98	Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant.	Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	IR	ОН	32.72	91.				13381	pumps)	O&M 1955 and 1961 1982 part of orig	District	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San		
5 5.67 6 5.67 7 5.67	С	21				Not Verified 39°14′51.204″N	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee	Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR		02.72		9			13381	pumps)	O&M 1955 and 1961 1982 part of orig	District Department of Fish and Game	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear	по	no
5.67	С	21	1429+98	2,216,368.25	6,664,376.98	Not Verified 39°14′51.204″N	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee	Cutoff Wall Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR	ОН	02.72	91.	9			13381	pumps)	O&M 1955 and 1961 1982 part of orig O&M 1955	District Department of Fish and Game Pacific Gas & Electric	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94105 4525 Franklin	no yes	no yes
5.67	С	21 21 21	1429+98 1429+68	2,216,368.25	6,664,376.98	Not Verified 39°14′51.204″N 39°14′50.912″N	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) -	Cutoff Wall Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL EL	ОН	02.72	91.	9			13381 pre-1955	yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, Spear Tower, San Francisco, CA 94104	no yes	no yes
5.67	C C C	21 21 21 21	1429+98 1429+68	2,216,368.25	6,664,376.98	Not Verified 39°14′51.204″N 39°14′50.912″N	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power 121°38'14.321"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam.	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL IR	ОН	02.72	91.	9			13381 pre-1955	yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94105 4525 Franklin Road, Yuba City, CA 95993-9316	no yes	no yes
5.67	C C C C	21 21 21 21 21 21	1429+98 1429+68	2,216,368.25	6,664,376.98	Not Verified 39°14′51.204″N 39°14′50.912″N Not Verified Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power 121°38'14.321"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) - Main Irrigation Canal approx 420 cfs. 12 kv pole line crossing of levee 30 feet from waterside toe for 792 feet 121°38'06.965"W To install a 12 kv pole line across and along the right bank levee of	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL IR IR	ОН	02.72	91.	8			13381 pre-1955 3610 and 7762	yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water District Pacific Gas and Electric	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94106 4525 Franklin Road, Yuba City, CA 95993-9316 5555 Florin-Perkins Road, Sacramento, CA 95826 5555 Florin-Perkins Road, Sacramento, CA 95826 5555 Florin-Perkins Road, Sacramento, CA 95826	yes yes yes	yes yes
5.67	C C C C C	21 21 21 21 21 21 21	1429+98 1429+68 1429+50 1428+50	2,216,368.25 2,216,338.71	6,664,376.98 6,664,376.58	Not Verified 39°14′51.204″N 39°14′50.912″N Not Verified Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power 121°38'14.321"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) - Main Irrization Canal approx 420 cfs 12 kv pole line crossing of levee 30 feet from waterside toe for 792 feet	Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL IR EL IR EL	ОН	02.72	91.	8			13381 pre-1955 3610 and 7762	yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water District Pacific Gas and Electric Company Pacific Gas and Electric	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 405 Franklin Road, Yuba City, CA 9593-9316 5555 Florin-Perkins Road, Sacramento, CA 95826 1190 Civic Center Blvd., Yuba City, CA 95826	yes yes no	yes yes no
5 5.67 7 5.67 8 5.65 9 5.20 0 5.08	C C C C C C	21 21 21 21 21 21 21 21 21 21 21 21 21 2	1429+98 1429+68 1429+50 1428+50	2,216,368.25 2,216,338.71	6,664,376.98 6,664,376.58	Not Verified 39°14′51.204″N 39°14′50.912″N Not Verified Not Verified 39°14′22.343″N	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) - Main Irrigation Canal approx 420 cfs 12 kv pole line crossing of levee 30 feet from waterside toe for 792 feet 121°38'06.965"W To install a 12 kv pole line across and along the right bank levee of the Feather River. End Seepage Interceptor Trench located on landside toe of levee Plant 9 acres of Kiwi plants on waterside of levee between	Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL IR EL EL EL	ОН	02.72	91.	8			3610 and 7762 8533	yes, cond 13 yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955 1961 and 1971 1973	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water District Pacific Gas and Electric Company Pacific Gas and Electric Company	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94105 4525 Franklin Road, Yuba City, CA 95993-9316 5555 Florin-Perkins Road, Sacramento, CA 95826 1190 Civic Center Blvd., Yuba City, CA 95991 P.O. Box 461, Live CA 95991 P.O. Box 461, Live CA 95991 P.O. Box 461, Live CA 95991	yes yes yes yes	yes yes no no yes
5.67 5.65 5.20 5.08 4.91 4.91- 5.08	C C C C C C	21 21 21 21 21 21 21 21 21 21 21 21 21 2	1429+98 1429+68 1429+50 1428+50	2,216,368.25 2,216,338.71	6,664,376.98 6,664,376.58	Not Verified 39°14′51.204″N 39°14′50.912″N Not Verified Not Verified 39°14′22.343″N Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.314"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) - Main Irrigation Canal approx 420 cfs. 12 kv pole line crossing of levee 30 feet from waterside toe for 792 feet 121°38'06.965"W To install a 12 kv pole line across and along the right bank levee of the Feather River. End Seepage Interceptor Trench located on landside toe of levee Plant 9 acres of Kiwi plants on waterside of levee between Brideeford and Hermanson Avenues Plant 14 acres of Kiwi plants on waterside of levee upstream of	Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR EL IR IR SEEP	ОН	02.72	91.	8			13381 pre-1955 3610 and 7762 8533 7439	yes, cond 13 no no	O&M 1955 and 1961 1982 part of orig O&M 1955 1961 and 1971 1973 1971	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water District Pacific Gas and Electric Company Pacific Gas and Electric Company Levee District No. 9 Tom-A-Hay Farms, Inc. John Tomlinson and	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94105 4525 Franklin Road, Yuba City, CA 95993-9316 5555 Florin-Perkins Road, Sacramento, CA 95826 5555 Florin-Perkins Road, Sacramento, CA 95826 1190 Civic Center Blvd., Yuba City, CA 95991 P.O. Box 461, Live Oak, CA 95953 P.O. Box 461, Live Oak, CA 95953 P.O. Box 461, Live	yes yes yes yes	yes yes no no yes
5.67	C C C C C C	21 21 21 21 21 21 21 21 21 21 21 21 21 2	1429+98 1429+68 1429+50 1428+50	2,216,368.25 2,216,338.71	6,664,376.98 6,664,376.58	Not Verified 39°14′51.204″N 39°14′50.912″N Not Verified Not Verified Not Verified Not Verified Not Verified	Pump end has gate valves on structure. Automatic drainage gates on the landside end. To construct and operate a vertical-perforated plate fish screen with a power operated brush on the right bank of Feather River. Located at Sunset Pump Plant. 36" CM pipe crossing through levee 121°38'14.31"W 12 KV OH Power Existing rubble coffer dam constructed with Rec Board Permit 3610. Repair coffer dam. Sutter Butte Main Canal Begin (Station 1428+50 to 1433+83) - Main Irrigation Canal approx 420 efs. 12 kv pole line crossing of levee 30 feet from waterside toe for 792 feet 121°38'06.965"W To install a 12 kv pole line across and along the right bank levee of the Feather River. End Seepage Interceptor Trench located on landside toe of levee Plant 9 acres of Kiwi plants on waterside of levee between Bridgeford and Hermanson Avenues	Cutoff Wall Cutoff Wall	will need a positive shut-off structure installed and proper check valves at pump. Pumping up and over levee does not appear to be feasible. Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR IR IR EL IR IR IR EL Trees	ОН	02.72	91.	8			3610 and 7762 8533 7439 15201	yes, cond 13 no yes, cond 13 yes, cond 13	O&M 1955 and 1961 1982 part of orig O&M 1955 1961 and 1971 1973 1971 1991 1978	District Department of Fish and Game Pacific Gas & Electric Pacific Gas & Electric Sutter Extension Water District Pacific Gas and Electric Company Pacific Gas and Electric Company Levee District No. 9 Tom-A-Hay Farms, Inc.	CA 95993-9316 1701 Nimbus Road, Ranch Cordova, CA 95670 One Tower, Spear Tower, San Francisco, CA 94105 One Tower, Spear Tower, San Francisco, CA 94107 4525 Franklin Road, Yuba City, CA 95903-9316 5555 Florin-Perkins Road, Sacramento, CA 95826 5555 Florin-Perkins Road, Sacramento, CA 95826 1190 Civic Center Blvd., Yuba City, CA 95991 P.O. Box 461, Live Coak, CA 95953	yes yes yes yes	yes yes no no yes

Levee	SBFCA	SBFCA	SBFCA STA	Location (I Northing	NAD 83) Easting	Location Latitude	(WGS 84) Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Elevat Invert of			Water St 100 Yr	200 Yr	500 Yr DW		FPB Permit In Require	ormation Year	Owner In Name	formation Address	verified	Pict
Mile	Phase	Reach			5			, , , , , , , , , , , , , , , , , , ,		71		Pipe		Levee			195		Permittee to Relocate					Tak
4.81	E	21				Not Verified	To pump storm water from landward drainage ditch over the right- bank levee of the Feather River from one separate location for approximately size at the end of Hermansen Road. Pipe has been-	Cutoff Wall		SD(P)								136	yes, cond 1	1983	Sundown Farms, Inc.	1350 Hermansen Avenue, Live Oak, CA 95953	n/a	n/
4.80	С	21	1391+96	2,212,767.43	6,665,226.86	39°14'15.579"N	121°38′03.695″W To extend a 12 kv pole line out into the right bank levee and overflow area of the Feather River	Cutoff Wall		EL	OH	i		89.77				853	33 yes, cond 1	3	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	:
4.50	С	21	1375+35	2,211,296.56	6,665,998.34	39°14′01.009″N	121°37'53.965"W Sutter Extension Sunset Lateral Begin (Station 1375+35 to 1428+50) Open irrigation ditch 15 feet from landside toe	Cutoff Wall		IR				89.42							Sutter Extension Water District	94105	yes	2
4.48	С	21	1374+94	2,211,260.36	6,666,016.66	39°14'00.651"N	121°37'53.734"W Begin Seepage Interceptor Trench located on landside toe of levee	Cutoff Wall		SEEP								1520	01 no	1991	Levee District No. 9	CA 95993-9316 1190 Civic Center Blvd., Yuba City,	no	1
4.10- 4.38	С	21	1375+00			Not Verified	To level and plant 13 acres Peach Orchard on the right bank overflow area of the Feather River	Cutoff Wall		Trees								984	yes, cond 1	1975	Bruce Jenlins	CA 95991 7035 Kent Avenue Live Oaks, CA	e, no	п
4.47	С	20/21	1374+33				Reach 20/21 Transition															23233		
4.10- 4.38	С	20	1350+00			Not Verified	To plant peach trees and to establish two wells and install pumping plants in right bank overflow of the Feather River	Cutoff Wall		EL	OH							638	yes, cond 5	1969	James Eager	7245 Larkin Road, Yuba City, CA	, no	
4.10- 4.38	С	20	1350+00			Not Verified	To extend 12 kv pole line parallel to the water ward toe of levee for a distance of approximately 1,500 feet north from Koch Lane, on the right bank overflow area of the Feather River/	Cutoff Wall		EL	OH							1074	yes, cond 1	1975	Pacific Gas and Electric Company	95953 5555 Florin-Perkin Road, Sacramento, CA 95826		
4.10	С	20	1347+37	2,208,612.74	6,666,676.45	39°13'34.454"N	121°37'45.485"W To install a 60 foot pole 86 feet from the landward toe of the levee, a 60 foot pole 10 feet from the water ward toe of the levee and 6 additional poles on the right bank overflow of the Feather River. The 12kv electrical service will be extend across the levee to serve a pump installed under Permit 6380. The span across the levee will be 234 feet. The clearance between the overhead wires and the top	Cutoff Wall		EL	OH			89.77				65.	5 yes, cond 1	1969	Pacific Gas and Electric Company	5555 Florin-Perkin Road, Sacramento, CA 95826		У
4.10	С	20	1347+00	2,208,582.82	6,666,680.19	39°13'34.158"N	121°37'45.487"W Underground communication cable through levee	Cutoff Wall		TL	4.0			89.58	79.98	82.33	88.93 8	1.39					yes	3
4.00	С	20	1345+00			Not Verified	To plant prune orchard on the right bank overflow area of the Feather River, downstream from Koch Road	Cutoff Wall		Trees								927	yes, cond 1	1974	Justin Micheli	6005 Highway 99, Live Oak, CA	yes	3
4.00	С	20	1345+00			Not Verified	To retain walnut orchard on the right bank overflow area of the Feather River, downstream from Koch Road	Cutoff Wall		Trees								921	77 no	1974	Justin Micheli	95993 6005 Highway 99, Live Oak, CA	yes	:
3.72	€	20-	1328+10	Not Verified		Not Verified	To pump storm water from landward drainage ditch over the right- bank levee of the Feather River from three separate location for approximately size at the end of Hermansen Road. Pipe has been	Cutoff Wall		SD(P)								1360	yes, cond 1	1983	Justin Micheli	6005 Highway 99, Live Oak, CA 95993	no	1
3.71	С	20	1328+00			Not Verified	To construct a 12 kv aerial power line on the right bank overflow area of the Feather River	Cutoff Wall		EL	OH	I						1159 11593	3, yes, cond 1	1976	Pacific Gas and Electric Company	One Tower, Spear Tower, San Francisco, CA	yes	1
3.71	С	20	1327+00	2,206,597.56	6,666,928.33	39°13'14.525"N	121°37'42.389"W 12KV overhead power line crossing	Cutoff Wall		EL	OH	i		89.71							Pacific Gas and Electric Company	One Tower, Spear Tower, San Francisco, CA	yes	
3.53	С	20	1317+15	Not Verified		Not Verified	Temporary storm discharge pipe through levee	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	SD(P)								1360)3	1983	Justin Micheli	94105 6005 Highway 99, Live Oak, CA 95993	no	
3.49	С	20	1315+03	2,205,398.45	6,666,943.63	39°13'02.672"N	121°37'42.272"W End Seepage Interceptor Trench located on landside toe of levee	Cutoff Wall	nine	SEEP								1520	01	1991	Levee District No. 9	1471 Coats Drive, Yuba City, CA	yes	1
3.48	С	20	1314+80	2,205,375.80	6,666,944.25	39°13'2.438"N	121°37'42.272"W Micheli Storm Drainage Pump Station. To install a pump with 20 Inch steel discharge pipe through the right bank of the Feather River for the removal of stormwater.	Cutoff Wall	Not sure whether pipeline meets the elevation criteria. The pipeline appears to meet title 23 requirements. Pumping could be option but not enough information available of the pump system. Should be part of 30 percent but not included.	SD(P)	2.0	84.73	86.40	88.20	79.00	81.65	88.28 8	3.94 1365	yes, cond 1	1983	Micheli	6005 Highway 99, Live Oak, CA 95993	yes	У
3.45- 3.75	С	19	1312+08			Not Verified	To plant an orchard and grade the land on the right bank overflow area of the Feather River. The project is located north of Yuba City	Cutoff Wall	isten on no mennen	Trees								368	no no	1961	Micheli	6005 Highway 99, Live Oak, CA		
3.30	€	20-	1305+30	Not Verified		Not Verified	approximately 5.5miles. To pump storm water from landward drainage ditch over the right-bank levee of the Feather River from one separate location for approximately size at the end of Hermansen Road. Pipe has been	Cutoff Wall		SD(P)								136	10 yes, cond 1	1983	Wilmax Farms, Inc	95993 1857 Encinal Road Live Oak, CA 95953	d, n/a	
3.18	С	19/20	1297+83				removed Reach 19/20 Transition																	+
3.0-	С	19	1295+00			Not Verified	To plant an orchard and grade the land on the right bank overflow area of the Feather River. The project is located north of Yuba City approximately 1.3 miles upstream (north) of the intersection of	Cutoff Wall		Trees								1629	98 no	1995	Timothy and Lori Filter	1010 Morse Road, Live Oak, CA 95953		T
3.10	С	19	1293+66	2,203,266.22	6,666,867.99	39°12'41.599"N	Easer Road and Live Oak Boulevard 121°37'43.329"W End Concrete Lined Ditch on landside toe of levee	Cutoff Wall		SEEP				89.14							USACE?	1325 J Street,	yes	+
3.08	С	19	1293+66	2,203,266.22	6,666,867.99	39°12'41.599"N	121°37'43,329"W 12 KV Overhead Power line crossing of levee. One pole 6 foot from levee toe.	Cutoff Wall		EL	OH	i		89.14				458	yes, cond 5	1964	Pacific Gas & Electric	Sacramento, CA One Tower, Spear Tower, San Francisco, CA	yes	
3.00	С	19					Begin Seepage Interceptor Trench located on landside toe of levee	Cutoff Wall		SEEP								1520)l no	1991	Levee District No. 9	94105 1471 Coats Drive, Yuba City, CA 95991	no	
2.90	С	19	1284+91	2,202,406.27	6,666,705.08	39°12'33.105"N	121°37'45.443"W Begin Concrete Lined Ditch on landside toe of levee	Cutoff Wall		SEEP				88.65	[USACE?	1325 J Street, Sacramento, CA	yes	
2.56	С	19	1266+71	2,200,600.09	6,666,626.50	39°11'40.511"N	121°37'23.859"W 12KV overhead power line crossing	Cutoff Wall		EL	OH	Í		88.28							Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	
2.54	С	19	1265+59	2,200,487.69	6,666,648.86	39°12′14.101″N	121°37'46.217"W Sullivan Pump Station. 18 inch steel pipe through the levee. Pump and Gate valve in pump house on the channel bank. Concrete well on the bank. Siphon breaker in CMP riser on landside slope. (Sullivan Pump Station)	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and automatic drainage gate on waterside of levee. Pumping up and over levee does not appear to be feasible. Pump does not appear to be used any longer and could remove as part of project. Should be part of	IR(P)	18.3	70.05	71.55	88.30	78.41	81.22	87.80 8	2.99 pre-195	55	0		194105	yes	
1.86	С	19	1229+41	2,197,325.05	6,668,184.53	39°11'42.843"N	121°37'26.919"W Kewall Singh IR PS. A 16 inch steel pipe through levee. Pump in pump house on channel bank. Gate valve on the waterside end. Concrete standpipe.	Cutoff Wall	20. oassonat but not insluded. The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.		3.0 or deeper through levee?	-		87.52	77.96	80.90	87.42 8	2.61 pre-195	55	part of ori O&M 195			yes	
1.80	С	19	1226+06	2,197,092.42	6,668,425.95	39°11'40.511"N	121°37'23.859"W 12 KV power pole located in landside slope	Cutoff Wall	0.000	EL	OH			87.29				+		1			yes	\dagger
1.32	C €	18/19 18	1213+85 1200+69	2,194,694.58	6,669,169.33	20°11'16 770"NT	Reach 18/19 Transition 121°37"14.543"W Abandoned 10 inch steel pipe through levee. Waterside end open.	Cutoff Wall	Not sure if the abandonment meets title 23	IR(P)	2.8		84.55	87.80					removed	2011	Wilbur Rev & 1994 Tri	st P.O. Box 3730,	yor	#
1.32		18	1200109	2,174,074.38	0,007,107.33	37 11 10.779 N	Steel Plate welded on landward end. Pump and Standpipe at the landside end. 12 KV power line in overflow and levee crossing north of Rednall	Cutoff Wall	requirements. Pipe may need to be properly- abandoned or completely removed.	EL.	OH		04.33	37.80				1196			Etal	Yuba City, CA 95992 One Tower, Spear	yes	+
							Road											11960				Tower, San Francisco, CA		

			Γ	Location (NAD 83)	Location	(WGS 84)					Elevat	tions (NGVD	1988)	Water Su	ırface Eleva	ation (NGVD 1	988)	CVFP	PB Permit Info	mation	Owner Inf	ormation	1	
Levee Mile	SBFCA Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe		Top of Levee	100 Yr	200 Yr		OWR Pe	ermit No.	Require Permittee to	Year	Name	Address	verified	Picture Taken
5 0.98	С	18	1182+75	Not Verified	1	Not Verified	20 Inch steel pipeline through levee (not installed) - Plans prepare by MHM Job No. 78-158	d Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. Could not find pipeline in the field. Should be part of	IR(A)	3.0)							12634	Relocate yes, cond 13	1979	Favero Farms	600 Rednall Road, Yuba City, CA 95991	no	no
5 0.97	С	18	1181+50	Not Verified	1	Not Verified	Abandoned 8 inch steel pipe through levee. Pipe plugged on the waterside toe.	Cutoff Wall	30 nercent but not included Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find in	IR(A)	4.0	76.6 (USED)	5		77.08	80.24	86.59	81.90	pre-1955		part of orig O&M 1955			no	no
7 0.96	С	18	1180+98	2,192,727.96	6,669,163.92	2 39°10'57.338"N	121°37'14.737"W 3 inch steel pipe through levee crown	Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. Could not find pipeline in the field.	IR(?)	1.0	86.05	86.30	87.30	77.07	80.24	86.58	81.89						yes	yes
8 0.95	С	18	1180+50	Not Verified	1	Not Verified	One 12 inch steel pipe through levee. Pipe exposed on landside slope	Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. Could not find pipeline in the field.	IR(A)	1.0)			77.06	80.23	86.57	81.89						no	no
0.98		18-	1182+75	Not Verified	1	Not Verified	To install an irrigation pump and a buried pipeline landward over- the right bank levee of the Feather River, upstream Rednall Road. Not install ner Reclamation Board	Cutoff Wall		IR(P)									12634	yes, cond 13	1981	Favero Farms	600 Rednall Road, Yuba City, CA 95991	n/a	n/a
0.80		18	1174+05 1170+04	2,192,034.01 2,191,638.99	6,669,096.85 6,669,057.61		121°37'15.605"W Water Well and Pump 20 feet from Landside toe 121°37'16.124"W 12KV overhead power line crossing	Cutoff Wall Cutoff Wall		EL	ОН	I		87.29 87.18								Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento,	yes	yes
2 0.40	С	18	1152+55	2,189,899.09	6,668,879.71	39°10'29.390"N	121°37′18.475″W Twin 110 KV Tower line across Feather River	Cutoff Wall		EL	ОН	I		86.95					3365	yes, cond 4	1960	Pacific Gas and Electric Company	CA 95826 5555 Florin-Perkins Road, Sacramento,	yes	yes
3 0.18	С	18	1138+22	2,188,574.27	6,668,732.99	39°10'16.301"N	121°37'20.408"W 12 KV and 40/60 KV power pole located in landside slope	Cutoff Wall		EL	OH	ĺ		86.71								Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento, CA 95826	yes	yes
4 0.08	С	18	1135+31	2,188,188.41	6,668,676.43	39°10'12.536"N	121°37'21.138'W 16 inch gas line through the levee. Marker post on the waterside shoulder	Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.	GL	3.5			86.50	76.15	79.58	85.73	81.27				Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento, CA 95826	yes	yes
5 16.52- 16.65 and 0.00-	С	17	1133+00			Not Verified	To construct 1,180 feet of 12 kv line in the right bank overflow are of the Feather River	a Cutoff Wall		EL	OH	Ĭ.							12750	yes, cond. 13	1979	Pacific Gas and Electric Company	5555 Florin-Perkins Road, Sacramento, CA 95826	no	no
1 16.65	C	18 18	1132+61 1132+09	2,187,967.19	6,668,647.98	30°10'00 827"N	Levee District No. 1 Levees /Levee District No. 9 Transition 121°37'21.468"W 8-5/8" steel pipeline within railroad right-of-way parallel to tracks	Cutoff Wall	The pipeline is appears to meet the elevation	GI				84.80	76.09	79,54	85.67	81.07	3823	ves cond 5	1961	Southern Pacific Pine Lir	se 610 South Main	VOS	ves
1 10.03	C	18	1132+09	2,107,907.19	0,008,047.98	5 39 1009.827 N	121 37 21.400 W	Culon wan	requirement over 200 year WSEL based on the record information. Type of pipe might not meet Title 23. We will need a positive shut-off structure installed and automatic drainage gate on waterside of levee.	GL				64.60	76.09	79.34	83.07	81.07	3023	yes, cond 5	1961	Southern Pacific Pipe Lir Co.	Street, Los Angeles, CA	yes	yes
2 16.65	С	18	1131+82	2,187,840.25	6,668,647.20	39°10′09.827″N	121°37′21.468″W Fiber optic warning sign	Cutoff Wall	The fiber optic most likely does not meet the elevation requirement over 200 year WSEL becuase the cable appears to run adjacent to rail which is barely above the 200 year. Type of wire might not meet Title 23.	TL				84.80	76.09	79.54	85.67	81.07						yes	yes
3 16.65	C	17/18 17	1130+86 1130+47	2,187,705.38	6,668,643.93	39°10'07.716"N	Reach 17/18 Transition 121°37'21.585"W Union Pacific Railroad Crossing. There is no stop log structure.	Cutoff Wall	The railroad crossing does not include any structure.	RR	6.0)		81.32								Union Pacific RR	1400 Douglas Stop	yes	yes
4 16.60	C	17	1128+00			Not Verified	To construct a ramp on the waterside slope of the right bank levee	Cutoff Wall	There is not a stop log structure and is simply a low area within the levee.	Struc									10525	yes, cond. 13	1975	Keith Boone	#1640, Omaha, NE 68179 P.O. Box 95, Live	no	no
5 16.60	С	17	1127+48	2,187,405.84	6,668,629.29	39°10'04.756"N	on the Feather River adjacent to the SPRR. 121°37'21.787"W Village Green Trailer Park - To install a 10 inch outfall pipe through the right bank levee of the Feather River to provide storm drainage for a mobile home park.	Cutoff Wall	Not sure whether pipeline meets the elevation criteria or title 23 requirements but newer permit . Pumping could be option but not enough information available	SD(P)				87.90	76.02	79.48	85.59	81.01	13754	yes, cond 13	1984	Village Green Mobile Homes Park c/o Sargent and Morton	Oak, CA 95953 1155 Pease Road, Yuba City, CA 95991-8814	yes	yes
6 16.56	С	17	1125+00			Not Verified	To retain an existing irrigation well in the right bank overflow area of the Feather River.	Cutoff Wall	of the nump system.	Well									12759	yes, cond. 13	1979	DiFiore Ranches	5028 Carlson Road, Yuba City, CA	no	no
7 16.29	С	17	1111+46	2,185,808.02	6,668,723.59	39°09'48.957"N	121°37'20.672"W North Yuba City Drainage Area. 16 Inch welded steel 7 GA asphalt coated storm drain discharge pipe over levee connected to 24 inch pipe in overflow area, outfall ditch, and pipes in floodway	Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe might appears to meet Title 23. Appears no work required. We have as-	SD(P)	1.1	83.17	84.50	85.60	75.75	79.21	85.29	80.77	14420	no	1986	City of Yuba City	95991 1201 Civic Center Blvd., Yuba City, CA 95991	yes	yes
8 16.20	С	17	1107+82	2,185,444.63	6,668,754.75	39°09'45.365"N	121°37'20.297"W 12 KV crossing & power pole located in landside slope	Cutoff Wall	huilt drawings	EL	ОН	I.		86.09								Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	yes
9 16.01	С	17				39°09'35.29"N	121°37'15.71"W To install an intertie to an existing waste water line and abandon approximately 40 feet of 24 inch diameter pipe on the right bank of the Feather River.	Cutoff Wall		RW(P)	4.0)							15331	no	1989	City of Yuba City	94105 1201 Civic Center Blvd., Yuba City,	yes	yes
0 16.01	С	17	1096+81	2,184,404.96	6,669,131.69	39°09'35.073"N	121°37'15.566"W Yuba City Water Treatment Plant 28" (29 25/32" OD) 7 GA welde steel waterline pipe crossing of levee. New permit included installation of automatic drainage gates on pipelines. (copy of record drawings)	d Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe might appears to meet Title 23. Appears no work required. We have as-built	RW(P)	5.0	81.05 rd	83.6 est	87.70	75.61	79.08	85.16	80.62	5758 & 6016 & 13957 & 13593 &	yes, cond 13	1967 & 1968 & 1984 & 1983 & 1989	City of Yuba City	1201 Civic Center Blvd., Yuba City, CA 95991	yes	yes
1 16.01	С	17	1096+71	2,184,406.70	6,669,130.73	39°09'35.090"N	121°37'15.578"W Yuba City Water Treatment Plant 24° 7 GA welded steel waterline pipe crossing of levee. New permit included installation of automatic drainage gates on pipelines. (copy of record drawings)	Cutoff Wall	drawings. The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe might appears to meet Title 23. Appears no work required. We have as-built	RW(P)	4.7	81.80 rd	83.8 est	87.80	75.61	79.08	85.16	80.62	5758 & 6016 & 13957 & 13593 &	yes, cond 13	1967 & 1968 & 1984 & 1983 & 1989	City of Yuba City	1201 Civic Center Blvd., Yuba City, CA 95991	yes	yes
2 16.01	С	17	1096+62	2,184,416.62	6,669,124.90	39°09'35.189"N	121°37"15.652"W Yuba City Water Treatment Plant 42"cement mortar lined and coated welded steel pipe waterline crossing of levee (copy of record drawings)	Cutoff Wall	Irrawines. The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe might appears to meet Title 23. Appears no work required. We have as-built drawines.	RW(P)	2.5	82.50 rd	86.1 est	88.40	75.61	79.08	85.16	80.61	17977	yes, cond 28	2005	City of Yuba City	1201 Civic Center Blvd., Yuba City, CA 95991	yes	yes
3 16.00	С	17	1096+74	2,184,416.62	6,669,124.90	39°09'35.189"N	121°37'15.652'W To install a 12 kv aerial pole line extension across the right bank levee of the Feather River. The pole line shall serve the Yuba City Water treatment Plant intake pump station	Cutoff Wall		EL	OH	I		88.30					6067	yes, cond 5	1968	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
4 15.68	C	16/17	1080+00 1079+91	2,183,133.99	6,670,212.82	2	Reach 16/17 Transition 8 inch Gas Line	Flatten Waterside Slope	The pipeline is appears to meet the elevation	GL	3.5	;			75.51	78.99	85.03	80.36				Pacific Gas & Electric	One Tower, Spear	yes	yes
5 15.56	С	16	1073+41	2,182,671.85	6,670,670.15	5 39°09'17.878"N	121°36′56.126″W 16 inch Gas Line (PG&E Map shows the gas main as 12 inch)	Flatten Waterside Slope	requirement over 200 year WSEL based on the record information and type of pipe may or may not meet Title 23. Appears no work required but need to pothole to werify. The pipeline is appears to meet the elevation	GL	3.5			85.65	75.51	78.99	85.03	80.21				Pacific Gas & Electric	Tower, San Francisco, CA 94105 One Tower, Spear	yes	yes
									requirement over 200 year WSEL based on the record information and type of pipe may or may not meet Title 23. Appears no work required but need to pothole to verify.		5.5					. 3.27						Jan 22 Zacomo	Tower, San Francisco, CA 94105		-
5 15.15 7 14.98		16 16	1054+75 1043+52 n	2,181,074.23 ot verified	6,671,588.96	not verified	121°36′44.548″W Telephone Call box on landside hinge point Abandon 36 inch pipe	Flatten Waterside Slope Flatten Waterside Slope	Not sure if the abandonment meets title 23	TL SS(A)				86.66					pre-1955		part of orig			yes no	yes no
								,	requirements. Pipe may need to be properly												O&M 1955		1		

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Levee SBFCA Mile Phase	SBFCA Reach	SBFCA STA	Location (I Northing	Easting	Latitude	(WGS 84) Longitude	Encroachment	Proposed Levee Improvement	Required Improvement Work	Type		Top of Pipe	Top of 100 Y Levee		500 Yr DWR 1957		PB Permit Information Require Permittee to	Year Year	Owner Info	Address	verified	d Picture Taken
18 14.98 C	16	1043+52	2,180,149.57	6,672,223.24	1		Abandoned 27 inch Centrifugal Spun Concrete Pipe. City of Yuba City Drawing 214-D per 1949 plans	Flatten Waterside Slope	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	SS(A)	38.6 45.4	5 47.70	86.30 75	.17 78.56	84.45 79.6	1 pre-1955	Relocate no	1949	City of Yuba City	1120 Civic Center Blvd., Yuba City,	no	no
19 14.98 C	16	1043+45	2,180,137.11	6,672,230.51	39°08'52.758"N	121°36'36.455"W	To install a 36 Inch discharge pipe through right bank of Feather River.	Flatten Waterside Slope	abandoned or completely removed. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to	SD(P)	5.0 80.0 r	d 83.0 rd	86.40 75	.17 78.56	84.45 79.6	1 13930	yes, cond 13	1984	Gilsizer Drainage County Drainage District	CA 95991 701 Bogue Road, Yuba City, CA 95991	yes	yes
20 14.98 C	16	1043+27	2,180,126.23	6,672,235.13	8		To install a 24 inch wrapped steel pipe through the right bank levee of the Feather River	Flatten Waterside Slope	verify Working on obtaining as-built drawings Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to	SD(P)	2.0 81.3 r	d 83.0 rd	86.30 75	.17 78.56	84.45 79.6	1 12074	yes, cond 13	1977	Gilsizer Drainage County Drainage District	701 Bogue Road, Yuba City, CA 95991	yes	yes
21 14.98 C	16	1043+22	2,180,121.72	6,672,237.88	39°08'52.605"N	121°36'36.362"W	To construct a 24 inch steel pipe storm drainage discharge pipe crossing the west levee of the Feather River	Flatten Waterside Slope	verify. Working on obtaining as huilt drawings. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to	SD(P)	4.0 81.3 r	d 83.3 rd	86.20 75	.17 78.56	84.45 79.6	7019	yes, cond 5	1970	Gilsizer Drainage County Drainage District	701 Bogue Road, Yuba City, CA 95991	yes	yes
22 14.98 C	16	1043+03	2,180,106.36	6,672,244.70	0 39°08'52.453"N	121°36'36.276"W	Gilsizer Slough Storm Drain Facilities. A 16 inch welded steel discharge pipe crossing of levee. (copy of record drawings)	Flatten Waterside Slope	serify. Working on obtaining as-huilt drawings. The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe appears to meet Title 23. The cover over pipe is questionable. Appears no work	SD(P)	1.3 83.30 r	d 84.7 esi	85.90 75	17 78.56	84.44 79.6	3112	yes, cond 4	1959	City of Yuba City	1201 Civic Center Blvd., Yuba City, CA 95991	yes	yes
23 14.88 €	16-	1037+50	Not Verified		Not Verified	1	Abandoned 8 inch gas line through levee. Removed per Permit- 1445A	Flatten Waterside Slope	required but need to pothole to verify. Not sure if the abandonment meets title 23- requirements. Pipe may need to be properly-	GL			75	.08 78.46	84.30 79.4	(installed)	yes, cond 13	part of orig O&M 1955	Pacific Gas & Electric	One Tower, Spear Tower, San	no	no
24 14.43- C 15.26	16						4,400 lineal feet of Blanket Drain on landside slope of levee starting approx 0.20 miles downstream of 10th Street Bridge	Flatten Waterside Slope	abandoned or completely removed.							and 1445A (removed) 15034		and 1974 (abandon) 1988	Levee District No. 1	Francisco, CA 94105 243 Second Street, Yuba City, CA	no	no
25 14.67 C	16	1028+11	2,178,636.47	6,672,461.02	2 39°08'37.915"N	121°36'33.611"W	extending north Power pole in waterside slope	Flatten Waterside Slope		EL			82.67							95991	yes	yes
26 14.73 C	16	1029+10	2,179,608.80	6,672,356.03	39°08'47.530"N	121°36'34.890"W	To bury existing two submarine telephone cables into two parallel trenches 100 feet apart in the channel of the Feather River. Both cables were installed per Permit 1334 in September 15, 1948.	Flatten Waterside Slope		TL	5.0		84.71			1334 and 11851	yes, cond. 13	1948 and 1977	Pacific Telephone and Telegraph Company	1426 Howe Avenue Suite 50, Sacramento, CA	e, yes	_
27 14.71 C	16	1028+10	2,179,506.59	6,672,370.16	39°08'46.519"N	121°36'34.717"W	To bury existing two submarine telephone cables into two parallel trenches 100 feet apart in the channel of the Feather River. Both cables were installed per Permit 1334 in September 15, 1948.	Flatten Waterside Slope		TL	2.0		84.77			1334 and 11851	yes, cond. 13	1948 and 1977	Pacific Telephone and Telegraph Company	1426 Howe Avenue Suite 50, Sacramento, CA	e, yes	yes
28 14.68 C	16	1026+71	21,784,783.54	6,672,514.29	39°08'36.643"N	121°36'33.928"W	10" Drain line in levee water side slope for bridge area drainage	Flatten Waterside Slope	Not sure if the conduit meets the elevation requirement over 200 year WSEL. The type of conduit may or may not meet Title 23 but it is newer encroachment permit. Need to pothole to verify.	TL			89.72			16995				95825	yes	yes
29 14.64 C	16	1026+58	2,178,488.35	6,672,429.49	39°08'36.452"N	121°36'34.019"W	40 foot long retaining wall landside of levee just upstream of the Feather River Bridge	Flatten Waterside Slope		Road						15133	no	1988	Levee District No. 1	243 Second Street, Yuba City, CA	yes	yes
30 14.63 C	16	1026+22	2,178,451.96	6,672,425.20	39°08'36.093"N	121°36'34.075"W	Feather River Bridge (SR 20) upstream side	Flatten Waterside Slope		Bridge			94.25			pre-1955			Caltrans	,,,,,	yes	yes
31 14.62 C	16	1025+32	2,178,375.92	6,672,443.76	39°08'35.340"N	121°36'33.844"W	Feather River Bridge (SR 20) downstream side	Flatten Waterside Slope		Bridge			93.90			pre-1955			Caltrans		yes	yes
32 14.62 C	16	1024 - 05	2 179 210 02	6 672 456 24	20000024 77703	12102622 60783	Seismic Retro of Feather River Bridge	Flatten Waterside Slope		Bridge	OH		00.17			16324		1995	Caltrans			
33 14.62 C 34 14.61 C	16 16	1024+95 1024+70	2,178,319.03	6,672,456.34	Not Verified		12 kv power line across levee Backfill Community Swimming Pool located near the base of the Feather River Bridge (10th Street Bridge)	Flatten Waterside Slope Flatten Waterside Slope		EL	ОН		88.17			7599	yes, cond 13	1971	City of Yuba City	1201 Civic Center Blvd., Yuba City,	no	no
35 14.60 C	16	1024+48	2,178,296.55	6,672,470.53	39°08'34.556"N	121°36'33.508"W	40 foot long retaining wall landside of levee just downstream of the Feather River Bridge	Flatten Waterside Slope		Road						15133	no	1988	Levee District No. 1	CA 95991 243 Second Street, Yuba City, CA	yes	yes
36 14.56 C	16	1021+95	2,178,044.07	6,672,487.29	39°08'32.058"N	1 121°36'33.310"W	12 kv power line across levee	Flatten Waterside Slope		EL	ОН		84.48						Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	yes
37 14.55 C	16				Not Verified	i	Telephone line on river slope of levee 260 feet downstream of	Flatten Waterside Slope		TL						2703		1957	AT&T	94105		+
38 14.55 C	16	1020+85	Not Verified		Not Verified	i	Feather River Bridge (10th Street Bridge) Abandon 4 inch pipe	Flatten Waterside Slope	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed.		1.3 77.7	2	74	.85 78.16	83.90 78.7	5					yes	yes
39 14.52 C	16	1020+30	2,177,879.35	6,672,496.38	39°08'30.430"N	121°36'33.203"W	Telephone Call box on waterside hinge point	Flatten Waterside Slope	mandoned of completel tempored.	TL			84.09								yes	yes
10 14.51 C	16	1019+82	2,177,832.15	6,672,504.71	39°08'29.963"N		Power pole in waterside slope	Flatten Waterside Slope		EL	OH		84.09								yes	yes
11 14.43 C to 15.26	16	1013+00			Not Verified		To place approximately 4,000 feet of blanket drain and filter trench on the right bank of levee of the Feather River upstream and downstream of the SR 20 Bridge			Struc						15034		1988	Levee District No. 1	243 Second Street, Yuba City, CA 95991	yes	
42 14.36 C	16	1010+75	2,176,773.87	6,672,930.97	7 39°08'19.484"N	1 121°36'27.747"W	Install Guy within in landside slope of levee, 12 kV overhead electric	Flatten Waterside Slope		EL			85.00			2640	yes, cond 4	1957	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
43 14.30 C	16	1008+38	2,176,779.63	6,672,929.15	5		12 kv power line across levee	Flatten Waterside Slope		EL	ОН		84.62						Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
44 14.60- C 14.79 C	16	1007+50			Not Verified	1	To construct approximately 1,300 feet of 12 foot wide bicycle trail on the crown of the right bank levee of the Feather River. The Project is located in Yuba City between the 5th Street Bridge and the easterly extension of Teagarden Avenue	Flatten Waterside Slope		Struc						16344	no	1995	County of Yuba	915 8th Street, Suite 125, Marysville, CA 95901		no
15 14.30 C	16	1007.5	2 177 700 2 1	£ £70,001,00	20000110 044"	1 101002007 112000	Bike Path below Twin Cities Memorial Bridge	Flatten Waterside Slope		Road			97.00			16235	100 00 1 4	1992	City of Yuba City and City of Marysville	Blvd., Yuba City, CA 95991	yes	
46 14.30 C 47 14.30 C	16	1007+51		6,672,981.09 6,672,984.37			Twin Cities Memorial Bridge upstream side Light pole in water side levee slope	Flatten Waterside Slope Flatten Waterside Slope		Bridge	ОН	1	87.92			2481	yes, cond 4	1957	County of Sutter and Yuba City of Yuba City	Blvd., Yuba City, CA 95991 1201 Civic Center	yes	
												1	97.00			2401	100 14	1057		Blvd., Yuba City, CA 95991		
48 14.30 C	16	1007+06		6,673,005.93			Twin Cities Memorial Bridge downstream side	Flatten Waterside Slope		Bridge			87.99			2481	yes, cond 4	1957	County of Sutter and Yuba	Blvd., Yuba City, CA 95991	yes	yes
49 14.30 C	16	1006+93	2,176,642.84	6,672,995.25	5 39°08'18.186"N	1 121°36′26.939″W	Power line and Anchor in Levee (actual location)	Flatten Waterside Slope		EL			87.92			2367		1957	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
50 14.28 C	16	1006+60	2,176,647.27	6,673,046.63			Sacramento Northern Railroad	Flatten Waterside Slope		RR	av.		86.76			pre-1955		part of orig O&M 1955	Union Pacific Railroad	1400 Douglas Stop #1640, Omaha, NE 68179		
51 14.28 C	16	1006+07	2,176,610.55	6,673,084.90	39°08'17.863"N	121°36'25.803"W	Power Pole and anchor in slope of levee. 100 feet south of the SNRR bridge w/ service power overhead	Flatten Waterside Slope		EL	ОН		84.44			2475		1957	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA 94105	yes	yes
52 14.25 C	16	1005+80			Not Verified		Authorize concrete steps ad 4 inch diameter PVC pipe on the landward slope and a pump house within 10 feet of the landward toe.	Flatten Waterside Slope								16450	yes. Cond 15	1996	City of Yuba c/o Parks and Recreation	Blvd., Yuba City, CA 95991	no	
53 14.28 C	16	1003+72	2,176,461.52	6,673,266.98	30006.15 303.17		Power Pole and anchor in slope of levee. 300 feet south of the	Flatten Waterside Slope		EL	OH		83.28					I	Pacific Gas & Electric	One Tower, Spear	yes	

	SBFCA	SBFCA	SBFCA STA																				
.,,,,,,	Phase	Reach	bbi cirbini	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe	Top of Top Pipe Leve		200 Yr	500 Yr DWR 1957	Permit No.	Require Permittee to Relocate	Year	Name	Address	verified	Picture Taken
14.22	С	16	1000+55			Not Verified	City of Yuba City. To replace the existing retaining wall with an 8 foot high, 76 foot long concrete retaining wall on the landside of	Flatten Waterside Slope									16844	yes. Cond 27	1998	City of Yuba c/o Parks a Recreation	nd 1201 Civic Center Blvd., Yuba City,	no	no
14.23	С	16				Not Verified	the right (east) bank levee of Feather River. Authorize a 3-wire barded wire fence and two mature trees at the	Flatten Waterside Slope									16449	yes. Cond 18	1996	Levee District No. 1	CA 95993 430 Second Street,	no	no
14.17		16				N. W. C. I	landward toe. The project is located at 563 Second Street	Flore West in Class									16440	C117	1006	L. District No. 1	Yuba City, CA 95991		
14.17	C	16				Not Verified	Authorize a 3-wire barded wire fence with a gate within 5 feet of the levee toe and two mature trees at the landward toe. The project is located on Keyer Street	Flatten Waterside Slope									16448	yes. Cond 17	1996	Levee District No. 1	430 Second Street, Yuba City, CA 95991	no	no
14.13	С	16				Not Verified	Authorize a 120 foot long building at the landward toe	Flatten Waterside Slope									16447	no	1996	Rodney and Eleanor Fletcher	511 Second Street, Yuba City, CA	no	no
14.04	С	16				Not Verified	To excavate 25 feet into landward side of the right bank of the Feather River and construct a concrete retaining wall to provide	Flatten Waterside Slope		Struc							13951 and 13951	yes. Cond 13 (original) and		06 County of Sutter	1160 Civic Center Boulevard, Yuba	no	no
							parking lot space. The project is located at 463 2nd Street behind the Sutter County Administration Building/										(revised)		(revised)		City, CA 95993		
14.01	С	16	993+50			Not Verified	Authorize a building near the landward toe of the levee.	Flatten Waterside Slope									16446	******	1996	Dolores Scott	160 C Street, Yuba City, CA 95991		no
13.84- 14.01	C	16	993+56			Not Verified	To install approximately 1,010 feet of 8 foot high chain link fence on the waterside side of the right bank levee of the Feather River.	Flatten Waterside Slope									16499	no	1997	Levee District No. 1	430 Second Street, Yuba City, CA	no	no
13.98	С	16				Not Verified	Authorize a shed, concrete wall, and chain-link fence with gate at landward toe. The permit also covers two steel posts on the	Flatten Waterside Slope									16445	yes. Cond 18	1996	Joe and Patricia Benatar	423 Second Street, Yuba City, CA	no	no
13.96	С	16				Not Verified	shoulder and seventeen mature trees on the landward slone. Authorize a shed at the landward toe	Flatten Waterside Slope									16444	yes. Cond 16	1996	Lois Murphy Brown	413 Second Street, Yuba City, CA	no	no
13.95	С	16				Not Verified	Authorize a two-story garage and shop building at the landward toe and six mature trees on the landward slope	Flatten Waterside Slope									16443	no	1996	Marjorie Von Geldern	95991 407 Second Street, Yuba City, CA	no	no
13.94	C	16				Not Verified	Authorize a building at the landward toe and 21 mature trees and	Flatten Waterside Slope									16442	no	1996	Max and Sandra	95991 379 Second Street,	no	no
13.93	C	17	988+05	2,175,065.02	6,673,942.87		sprinkler system on the landward slope. 3 inch steel pipe, does not appear to cross levee anymore	Cutoff Wall	Not sure if the abandonment meets title 23	+				74	40 77.5	4 82.89 78.2	1			McClendon unknown	Yuba City, CA 95991	no	no
12.07	-					,,		Flore West 11 C	requirements. Pipe may need to be properly abandoned or completely removed.										10	H	272 6		
13.93	С	16				Not Verified	Authorize a garage and a shed at the landward toe	Flatten Waterside Slope									16441	yes. Cond 16	1996	Howard and Raona Hall	Yuba City, CA 95991	no	no
13.91	С	16				Not Verified	Authorize a small building, a chain-link fence, four mature trees at the landward toe, and five clumps of oleanders on the landward slone.	Flatten Waterside Slope									16440	yes. Cond 20	1996	Est. James Barr	365 Second Street, Yuba City, CA 95991	no	no
13.90	С	16				Not Verified	Authorize a small building and a chain link fence on an existing retaining wall at the landward toe, concrete stairs, a steel pipe	Flatten Waterside Slope									16439	no	1996	Mark Poole	355 Second Street, Yuba City, CA 95991	no	no
13.88	C	16				Not Verified	frame, and two large mature trees on the landward slope. A hose hih on the landward shoulder of the right hank of lever Authorize a see-through fence on a 5 foot retaining wall, steps, and	Flatten Waterside Slope									16438	yes. Cond 20	1996	Charles and Jean Sander	s 349 Second Street,	no	no
13.87	С	16				Not Verified	nine mature trees on the landward slope. Authorize concrete steps with railing and pomegranate bush on	Flatten Waterside Slope									16437	yes. Cond 16	1996	Theodore and Mary	Yuba City, CA 95991 341 Second Street,	no	no
13.86						Not Verified	landward slope. The permit also covers a concrete retaining wall at the landward toe	Flatten Waterside Slope									16436	yes. Cond 18		Wilkins Glenn and Jean Koball	Yuba City, CA 95991 335 Second Street,		
	С	16					Authorize Chain Link fence with gate, three oleander trees, and steps within the landward slope.	·													Yuba City, CA 95991	no	no
13.84	С	16				Not Verified	Authorize Chain Link fence with gate, three oleander trees, and steps within the landward slope.	Flatten Waterside Slope									16435	yes. Cond 21	1996	Steve and Nancy Albrech	Yuba City, CA 95991	no	no
13.81	С	16				Not Verified	Authorize building, barbed wire fence, and ten trees at landward toe	Flatten Waterside Slope									16434	yes. Cond 21	1996	Dennis Coakley	306 West 24th Avenue, San Mateo CA 94403	no o,	no
13.77	С	16				Not Verified	Authorize a 60 foot long see-through board fence and 75 foot long clothesline and landward toe. A shed 5 feet from landward toe and	Flatten Waterside Slope									16433	yes. Cond 17	1996	Ronald Souza	1550 Elizabeth Lane, Yuba City, CA 95993	no	no
13.76	С	16				Not Verified	a mature oak tree on the landward slope Authorize a chain-link fence with gate within 10 feet of landward toe	Flatten Waterside Slope									16432	yes. Cond 19	1996	Stevenson Family Trust	459-1/2 Palora Avenue, Yuba City	no ,	no
13.75	С	16				Not Verified	Authorize a see-through fence and storage shed within 10 feet of the landward toe. The project is located at 265 Second Street, Yuba										16431	yes. Cond 17	1996	Margaret Kellett	CA 95991 265 Second Street, Yuba City, CA	no	no
13.74	С	16				Not Verified	City. CA Authorize a see-through fence and storage shed within 5 feet of the landward toe. The project is located at 261 Second Street, Yuba	Flatten Waterside Slope									16430	yes. Cond 19	1996	Ernest Sandoval	95991 22301 Dersch Road Anderson, CA	l, no	no
13.73	C	16				Not Verified	City. CA Authorize a Chain Link fence with gate within 5 feet of landward toe, a cedar tree at the landward toe, and stone steps on the	Flatten Waterside Slope									16429	yes. Cond 17	1996	Teresa Filby	96007 2072 Sanborn, Yuba City, CA	no	no
							landward slope. This project is located at 255 Second Street.														95993		
13.68	С	16				Not Verified	Authorize a shed and three trees at the landward toe of the right bank levee of the Feather River. The project is located at 225 Second Street Yuba City. CA 95591	Flatten Waterside Slope									16428	no	1996	Minnie and Marvin Cole	2061 Royo Rancho Road, Yuba City, CA 95993	no	no
13.67	С	16				Not Verified		Flatten Waterside Slope									16427	yes. Cond 17	1996	Dossie and Wanda Smith	219 Second Street, Yuba City, CA	no	no
13.65	С	16				Not Verified	Authorize a residence within 5 feet of the landward toe	Flatten Waterside Slope									16426	yes. Cond 16	1996	Ronald Brockman	95991 209 Second Street, Yuba City, CA	no	no
13.64	С	16				Not Verified	Authorize a residence at landward toe and oak on the landward slone	Flatten Waterside Slope									16425	no	1996	Carl and Sandra Stout	95991 201 Second Street, Yuba City, CA	no	no
13.55	C	16	975+00			Not Verified		Flatten Waterside Slope									10967	yes, cond 13	1976	County of Sutter	95991 1160 Civic Center	+ +	
							the Yuba City Boat Ramp on the right bank of the Feather River.														Blvd., Suite D, Yuba City, CA 95993		
13.53	С	16	972+00			Not Verified	To construct improvement for the boat launching ramp and related facilities on the right bank of the Feather River.	-									2623	yes, cond 4	1957	Department of Fish and Game		no	no
13.53	С	16	972+00			Not Verified	To construct improvement for the Yuba City Boat Ramp consisting of a paved parking area, restroom facilities, floating boat dock and extension of concrete boat ramp on the right bank of the Feather	Flatten Waterside Slope									5741, 11989	no	1991	County of Sutter	1160 Civic Center Blvd., Suite D, Yuba City, CA		
13.53	С	16	972+00			Not Verified	River To reconstruct an existing access road to the Yuba-Sutter Boat Ramp on the right bank of the Feather River	Flatten Waterside Slope		+							9294	yes, cond 13	1974	County of Sutter	95993 1160 Civic Center Blvd., Suite D,	+	
13.53	С	16	972+00			Not Verified	To maintain and operate existing boat dock for public use for	Flatten Waterside Slope									10830.	yes, cond 13	1978	William Baldner	Yuba City, CA 95993 80 2nd Street, Yuba		
در.د۱						rvot vermed	boating, fishing, and a campground with related facilities including a mobile home on the right bank of the Feather River.	nation waterstile stope									15741	yes, cond 13	1978	William Dalullei	City, CA 95991	4	
4	C	15/16	968+50 968+00			Not Verified	Reach 15/16 Transition To construct 120 lineal feet of sheet piles retaining wall, and nine	Cutoff Wall	Located within floodway. Does not affect levee								17230	yes. Cond 26	2000	County of Sutter	1160 Civic Center		
			200100			.voc vermed	10 x 10 foot boat docks supported by seven 12 inc diameter steel piles to an existing 30 foot wide ramp (Yuba City Boat Ramp)	Cuton wall	project.								17230	yes. Cond 20	2000	Sound of Suite	Boulevard, Yuba City, CA 95993		
		i I				ļ	Reach 14/15 Transition	ļ		1	1		<u> </u>	1						l .		1	

				Location (!		Location (Elevati	ions (NGVD 1	988) W	ater Sur	face Elevation	on (NGVD 198	8) C	VFPB Permit	nformation	Owner I	nformation	<u> </u>	
Mile	SBFCA Phase	SBFCA S Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe		Top of 100 Levee) Yr	200 Yr 5	00 Yr DW		lo. Requir Permitte Reloca	to Yea	ar Name	Address	verified	Picture Taken
	С	13/14	927+00				Reach 13/14 Transition												Reloca					
90 12.50 13.07	C	15	925+00			Not Verified	To construct access ramps	Cutoff Wall	Located within floodway. Does not affect levee project.		'							746	0A	197	County of Sutter	1160 Civic Center Boulevard, Yuba		
90 12.5	l C	13	913+19	2,168,046.21	6,673,496.81	39°06'53.190"N	121°36′21.046″W Two 16 inch gas lines. (PG&E map shows the gas lines as 12 inc	ch) Cutoff Wall and relief wells at 200 foo	t The pipeline is appears to meet the elevation	GL	3.0	\vdash		82.00	72.16	75.17	80.17 7	77.14			Pacific Gas & Electric	City, CA 95993 One Tower, Spear	yes	yes
				_,,	*,****,*****		8	and 65 feet deep	requirement over 200 year WSEL based on the record													Tower, San	,	,
01 101			004.22	2.155.221.70	C (772 L 177 L0	2000 (125 1511)	1000000 5700W T	G - CON N - 1 - 1' C - 11 - 200 C	information and type of pipe might appears to meet Title 23. Appears no work required.		110							12	log.	12 105	D 15 G 151	Francisco, CA 94105		
91 12.1	5 C	13	894+23	2,166,221.70	6,673,147.49	39°06'35.1/1"N	121°36′25.578″W To install a 12kv buried power cable through the right bank leve and across the right bank overflow of the Feather River, a total	e Cutoff Wall and relief wells at 200 foot and 65 feet deep		EL	UG							124	yes, cond	13 197	78 Pacific Gas and Electri Company	C One Tower, Spear Tower, San	no	no
							distance of 896 feet. Poles will be installed near the top of the banks of the low water channel and aerial cable will be placed															Francisco, CA 94105		
							between the two poles which will be connected to the undergrou	ıd																
92 12.1	4 C	13	893+84	2,166,181.41	6,673,142.43	39°06'34.772"N	121°36′25.614″W Garden Highway Industrial Park. To install a 12 inch steel storn drain pipeline through the right bank levee of the Feather River	Cutoff Wall and relief wells at 200 foot and 65 feet deep	t The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record	SD(P)	3.3	77.70	78.70	82.00	71.72	74.77	79.80 7	6.93	yes, cond	13 197	79 City of Yuba City	1201 Civic Center Blvd., Yuba City,	yes	yes
							drain pipeline unough the right bank levee of the reducer rever	and 0.5 rect deep	information and type of pipe might appears to meet													CA 95991		
02 12 1			002.70	214417515	6 672 142 42	2000 (12.4 552)	Discours of Marie Day of the Control	G - CON N - 1 - 1 - 1 - 200 C	Title 23. Appears no work required. We have as-	an m	'	77.07	70.20	02.00	71.72	24.22	70.00	15.00		100		Land Girl G		
93 12.1	2 C	13	893+78	2,166,175.45	6,673,142.43	39°00 34.772 N	121°36′25.614″W Burns Drive Storm Water Pump Station. 16 inch steel storm dra discharge pipe through levee.	and 65 feet deep	requirement over 200 year WSEL based on the record	SD(P)	2.7	77.97	79.30	82.00	71.72	74.77	79.80 7	76.93 158	503	199	City of Yuba City	1201 Civic Center Blvd., Yuba City,	yes	yes
									information and type of pipe might appears to meet Title 23. Appears no work required. We have as-													CA 95991		
94 11.9) C	13	881+41	2,164,942.19	6,673,036.13	39°06'22.535"N	121°36'27.067"W Levee District No. 1 Relief Well Pump Station 6" and 14" pipes	Cutoff Wall and relief wells at 200 foor	huilt drawings t The pipeline is appears to meet the elevation	RW(P)) 5.1	75.23	76.40	81.50	71.49	74.54	79.57 7	6.79			Levee District No. 1	243 Second Street,	yes	yes
							located just southeast of the Waste Water Treatment Plant	and 65 feet deep	requirement over 200 year WSEL based on the record information and type of pipe appears to meet Title 23.													Yuba City, CA 95991		
									The cover over pipe is questionable. Appears no work	c												93991		
									required but need to pothole to verify.		<u></u> '												\bot	
95 11.4	3 C	13	856+23	2,162,702.52	6,674,085.34	39°06'05.58/"N	121°36′18.675″W South Yuba City Storm Drainage Pump Station 24 inch 7 GA St Pipe asphalt coated and wrapped with asphalt saturated felt	and 65 feet deep	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record	SD(P)	5.2	76.80	78.80	82.00	70.94	74.02	79.04 7	76.38 155	665 no	199	City of Yuba City	1201 Civic Center Blvd., Yuba City,	yes	yes
							discharge pipe		information and type of pipe might appears to meet Title 23. Appears no work required. We have as-													CA 95991		
96 11.4	3 C	13	856+08	2,162,689.81	6,674,093.30	39°06'05.587"N	121°36′18.675″W South Yuba City Seepage Interceptor Pump Station 24 inch 7 G/	A Cutoff Wall and relief wells at 200 foot	built drawings	SD(P)	5.2	76.80	78.80	82.00	70.94	74.01	79.03 7	76.37 155	i65 no	199	2 City of Yuba City	1201 Civic Center	yes	yes
				_,,	***************************************		Steel Pipe asphalt coated and wrapped with asphalt saturated felt		requirement over 200 year WSEL based on the record	(-)												Blvd., Yuba City,	,	,
							discharge pipe		information and type of pipe might appears to meet Title 23. Appears no work required. We have as-													CA 95991		
97 11.24	- C	13					Seepage Interceptor Trench and additional relief wells. The	Cutoff Wall and relief wells at 200 foot	Ibuilt drawings	1	+	\vdash		- -				158	350	199	Ol City of Yuba City	1201 Civic Center	no	no
11.95							improvements were adjacent to the River Oaks subdivision betw the wastewater treatment plant and Shanghai Road. All work on															Blvd., Yuba City, CA 95991		
98 10.80	- C	16				Not Verified	landside of levee. Bike Path below Twin Cities Memorial Bridge	Flatten Waterside Slope		Road	+-	\vdash		-	-+		-	168	320 yes. Con	28 199	08 City of Yuba City	1201 Civic Center	+-	
16.00																						Blvd., Yuba City, CA 95991		
	С	12/13	845+00				Reach 12/13 Transition																	
99 10.60 11.15	-	12					Shanghai Bend Road Setback levee project	No Rehabilitation Required			'] ,									USACE	1325 J Street, Sacramento, CA	no	no
	В	11/12	830+00				Reach 11/12 Transition																	
00 10.5	7 В	11	828+55	2,160,267.77	6,675,134.01	39°05'36.240"N	121°36′00.697″W City of Yuba City Sewer 24 inch welded steel pipe mortar lined coated pipe (wall thickness 0.188″ min) Discharge Pipe to river	and Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record	WW(P)) 2.3	75.70 rd	77.8 est	79.80	69.02	72.20	77.24 7	75.15 715	1D yes, cond	13? 197	74 City of Yuba City	1201 Civic Center Blvd., Yuba City,	yes	yes
							diffuser		information and type of pipe might appears to meet Title 23. Appears no work required. We have as-] ,										CA 95991		
01 10.4	7 B	11				Not Verified	To place an 18 inch storm drain pipeline through the levee on the	e Cutoff Wall	huilt drawings	SD(P)	.—	 						137	19 yes, con	13 198	Hauss and Steel Inc.	3909 Garden	n/a	n/a
10.4						Not vermed	right bank of the Feather River (project was not completed - no			SD(I)								152	yes, com	15 170	riads and steer me.	Highway, Yuba City, CA 95991	10 4	11/4
9.5	5 B	10/11	774+00				pipeline installed) Reach 10/11 Transition				H											City, CA 95991		
02 9.5) В	10				Not Verified	Construct gauging station 150 feet downstream of Shanghai Ben	d Cutoff Wall				1						40	yes, con	15 196	Department of Water	1120 N Street, Sacramento, CA	no	no
03 9.1	В	10	750+40	2,152,869.21	6,673,338.66	39°04'23.178"N	121°36'23.886"W 115 kv steel tower transmission line crossing of levee	Cutoff Wall		EL	OH							76	647	197	71 Pacific Gas and Electri	c One Tower, Spear	yes	yes
] ,									Company	Tower, San Francisco, CA		
04 9.1	В	10	750+10	2,152,823.05	6,673,332.24	39°04'22.722"N	121°36'23.970"W 12 kv power line crossing of levee	Cutoff Wall	+	EL	+	 						36	yes, con	15 196	Pacific Gas and Electri	c One Tower, Spear	yes	yes
																					Company	Tower, San Francisco, CA		
8.2	7 B	9/10	706+50				Reach 9/10 Transition														_	94105		
05 8.0		9	692+00			Not Verified	To construct 140 lineal feet of sheet piles retaining wall, and nin		Located within floodway. Does not affect levee									17		. 26 200	00 County of Sutter	1160 Civic Center	_	
							10 x 20 foot boat docks supported by seven 12 inch diameter stepiles to an existing 30 foot wide ramp (Boyd Pump Boat Ramp)		project.		'							115 115				Boulevard, Yuba City, CA 95993		
.06 7.9	4 B	9	692+00			Not Verified	To improve the existing Boyd Pump Boat Launching Facility by			Struc	+'	\vdash	-						380 yes, con	13 198	35 County of Sutter	1160 Civic Center	yes	yes
			5,2100			/ carried	widening the existing ramp to 30 feet with 4 foot walkways on e side, paving existing access road, and expanding parking area by	ach			'								, z, com	170		Boulevard, Yuba City, CA 95993	1,50	"-"
							spaces, and placing riprap on the right bank of the Feather River				'											Cny, CA 93993		
07 7.9	4 B	9	692+00			Not Verified	To construct boat launching ramp, well, pump, pressure system,	Cutoff Wall		Struc	T							26	yes, con	15 195	Department of Fish and		no	no
							and sanitary facilities on the right bank overflow of the Feather River				⊥'										Game			
.08 7.9	4 B	9	689+09	2,146,949.33	6,672,031.04	39°03'24.759"N	121°36′40.813″W Oswald Mutual Water Company (Boyds Pump) 18 inch epoxy coated mortar lined steel pipe through existing 24 inch concrete	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and	IR(P)	27.6	46.00	48.20	75.80	65.22	68.52	73.36 7	70.91 pre-1955			orig Oswald Mutual Water 1955 Company	Yuba City, CA 95991	yes	yes
							pipe crossing of levee		gate valve at pump. Pumping up and over levee does not appear to be feasible.		'									& 20				
									прош со ос госопоте.		'													
.09 7.9	4 B	9	689+00	2,146,953.52	6,672,029.11	39°03'24.759"N	121°36'40.813"W To replace an existing pole line with a new pole line across the	Cutoff Wall		EL	OH			75.94				116	yes, cond	13 197				yes
							right bank levee of the Feather River. A new pole will be placed feet landward of the landward toe of the levee and another pole v				'										Company	Road, Sacramento, CA 95826		
							be placed 24 feet water ward of the water ward toe of the levee.				⊥'													
10 7.9	4 B	9	689+00	2,146,953.52	6,672,029.11	39°03'24.759"N	121°36'40.813"W To place a service line on a PG&E pole crossing the right bank levee of the Feather River	Cutoff Wall		TL	OH			75.94				116	yes, con	13 197	76 Pacific Gas and Electric Company	c 1426 Howe Avenue, Suite 50,	ie, yes	yes
											'											Sacramento, CA 95826		
11 7.4	7 B	9	664+07	2,144,450.88	6,672,127.42	39°03'00.186"N	121°36'39.792"W Sierra Gold Nursery. An 8 inch steel pipe through levee. This pi was pressure checked and in 1984 as part of permit 13980 to	pe Cutoff Wall	Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe	SD(P)	3.6	70.23	70.90	74.50	64.57	67.89	72.68 6	59.90 pre-1955	& yes, con	part of O&M		5320 Garden Highway, Yuba	yes	yes
							was pressure enecked and in 1984 as part of permit 13980 to connect to existing pipe.		may or may not meet Title 23. Need to pothole to									135		& 19		City, CA 95991		
	В	9	664+20			Not Verified	To reconstruct and pave a 12 foot wide, approximately 1370 feet		Iverity		4.0	\vdash		+			 	171	28 yes. Con	23 199	9 Sierra Gold Nursery	5320 Garden	+	
12 7.40 -	i						long road on the landside toe of the right bank levee of the Feath River	er .			'											Highway, Yuba Citv. CA 95991		
7.40 - 7.64							Reach 8/9 Transition		1			1												
	В	8/9	654+75																					
		8/9	654+75	2,142,954.74	6,672,128.18	39°02'45.228"N	121°36′39.774″W 12 kv power line across levee 1900 feet downstream of Mesick Road	Cutoff Wall		EL	ОН							4017		1962 &	1963 Pacific Gas & Electric	One Tower, Spear Tower, San	yes	yes

Lev	vee SB	BFCA :	SBFCA	SBFCA STA	Location (N Northing	(AD 83) Easting	Location Latitude	(WGS 84) Longitude	le Encroachment	Proposed Levee Improvement	Required Improvement Work	Туре		Elevation Invert of	ons (NGVI Top of	7 1988) Top of	Water Surface 100 Yr 20	e Elevation (Information re Year	Owner Name	Information Address	verified	Picture
Mi		hase	Reach											Pipe	Pipe	Levee			1957		Permitt Reloc	ate				Taken
114 7.	.16	В	8	647+74	2,142,830.08	6,672,119.48	39°02'43.998"N	121°36'39.919"W	W Feather Water District North Pump Station 1-26" irrigation discharge pipes	Cutoff Wall	The pipeline appears to meet the elevation requirement over 200 year WSEL. May not meet 1957 profile requirement. The type of pipe may or may not meet Title 23. Appears no work required	IR(P)	1.6	69.90	71.90	73.50	64.28	67.60 7	2.36 69.	33 41	127 yes, co	nd 5 1962	Feather Water Distri	t 280 Willkie Avenue, Yuba City CA 95991	yes	yes
115 7.	.16	В	8	647+70	2,142,826.16	6,672,118.89	39°02'43.961"N	I 121°36'39.926"W	W Feather Water District North Pump Station 1-26" irrigation discharge pipes	Cutoff Wall	The pipeline appears to meet the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Appears no work required.	IR(P)	1.3	70.15	72.15	73.50	64.28	67.60 7	2.36 69.	33 41	127 yes, co	nd 5 1962	Feather Water Distri	t 280 Wilkie Avenue Yuba City, CA 95991	e, yes	yes
116 7.	.16	В	8	647+66	2,142,822.01	6,672,118.27	39°02'43.917"N	121°36'39.942"W	W Feather Water District North Pump Station 1-26" irrigation discharge pipes	Cutoff Wall	The pipeline appears to meet the elevation requirement over 200 year WSEL. May not meet 1957 profile requirement. The type of pipe may or	IR(P)	1.4	70.10	72.10	73.50	64.28	67.60 7	2.36 69.	33 41	127 yes, co	nd 5 1962	Feather Water Distri	t 280 Wilkie Avenue Yuba City, CA 95991	e, yes	yes
117 7.	.16	В	8	647+61	2,142,817.52	6,672,117.60	39°02'43.870"N	121°36'39.951"W	W Feather Water District North Pump Station 1-26" irrigation discharge pipes	Cutoff Wall	max not meet Title 23. Annears no work required. The pipeline appears to meet the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Appears no work	IR(P)	1.3	70.15	72.15	73.50	64.28	67.60 7	2.36 69.	33 41	127 yes, co	nd 5 1962	Feather Water Distri	t 280 Wilkie Avenue Yuba City, CA 95991	e, yes	yes
118 6.	.69	В	8	622+79	2,140,350.59	6,671,955.66	39°02'19.494"N	121°36'42.102"W	W 12 kv power line across levee	Cutoff Wall	required.	EL	ОН							40	003	1962	Pacific Gas & Electr	One Tower, Spear Tower, San Francisco, CA	yes	yes
6.	.41	В	7/8	596+00					Reach 7/8 Transition															94105		
119 6.	.35	В	7	592+67	2,137,447.24	6,671,791.94	39°01'50.802"N	121°36'44.334"W	V 12 kv power line across levee	565+00 to 596+00 Cutoff Wall		EL	OH							45	yes, co	nd 5 1963	Pacific Gas & Electr	One Tower, Spear Tower, San Francisco, CA	yes	yes
120 6.	.00	В	7	587+00	2,136,925.70	6,671,619.94	39°01'45.654"N	121°36'46.542"W	W Spur Levee upstream of Abbott Lake	565+00 to 598+87 Cutoff Wall										3787 a		nd 5 1961 a 1963	d C.E. Sullivan	94105 5320 Garden Highway, Yuba	yes	yes
121 5.5 · 6.2	-	В	7	560+00			Not Verified	i	To fill in approximately one mile of an existing irrigation ditch at the waterside toe of the right bank of the Feather River.	510+37 to 546+00 Cutoff Wall		Struc								147	717 no	1987	Department of Fish a	City. CA 95991 nd 1701 Nimbus Road Ranch Cordova, CA	l, A	
122 5.	.50	В	7	560+00			Not Verified	i	To construct a water well with a 14 inch casing in the right bank	510+37 to 546+00 Cutoff Wall		Struc								128	337 yes, cor	d. 13 1980	A.S. Cozzolino	95670 9 Cozzolino Drive,	no	no
123 5.	.50	В	7	560+00			Not Verified	1	overflow of the Feather River at Abbott Lake To extend approximately 2,500 of 12kv electric service line in the right bank overflow area of the Feather River near Abbott Lake to	510+37 to 546+00 Cutoff Wall		EL	ОН							128	332 yes, cor	d. 13 1980	Pacific Gas & Electr Company	Road, Sacramento,	s no	no
124 5.	.22	В	7	545+41	2,132,940.57	6,672,317.26	39°01'06.071"N	121°36'37.818"W	serve 25 HP Ag Pump for A.S. Cozzolino. V Crushed CMP Riser in Land Side Slope. Possible location of 8 inch steel pipe.	510+37 to 546+00 Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	IR(A)	3.1	67.33	68.00	71.10	63.16	66.46 7	.05 67.	11 pre-19	955	part of o		CA 95826	yes	yes
125 5.	.05	₽	7-	536+73	2,132,153.19	6,672,681.57	39°00'58.434"N	121°36'33.348"W	Existing 10 inch steel pipe. Removed in 1964 by Levee District No.	510+37 to 546+00 Cutoff Wall	abandoned or completely removed. Not sure if the abandonment meets title 23	IR(?)							+	pre-19			rig Levee District No. 1	243 Second Street,	yes	yes
126 5.	.05	В	7	536+64	2,132,149.73	6,672,692.81			1 as part of permit 4775 5 inch steel drainage pipe	510+37 to 546+00 Cutoff Wall	requirements. Pipe may need to be properly- abandoned or completely removed.	SD(P)	2.0			70.50	63.04	66.34 7	0.91 66.	and 47	161 yes, cond	O&M 1		Yuba City, CA 95991 5320 Garden	no	no
			,								Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to yerify.		2.0											Highway, Yuba City, CA 95991		
127 4.		В	7	529+47	2,131,549.40	6,673,081.12			Abandon 6 inch pipe	510+37 to 546+00 Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed.	IR(A)	4.0			70.60	62.95	66.25 7	0.81 66.	72 pre-19	955	part of o	555		no	no
128 4.50 5.25	5	В	7						Seepage Interceptor Trench for Star Bend Relief Well Pumps	510+37 to 546+00 Cutoff Wall													USACE	1325 J Street, Sacramento, CA	yes	yes
129 4.	.50	В	7	512+08	2,130,379.55	6,674,329.99	39°00'40.852"N	121°36'12.526"W	W Corp of Engineers Star Bend Road Relief Well Pump Station north 15" Steel Discharge Pipe Crossings	510+37 to 546+00 Cutoff Wall	The pipeline meets the elevation requirement over 200 year WSEL based on the as-built information and type of pipe meets Title 23 requirements. Does not require any work. It does not meet 1957 criteria	SD(P)	3.8	66.15	67.40	71.20	62.77	66.06 7	0.59 66.	37 no peri issi	mit no ued		USACE	1325 J Street, Sacramento, CA	yes	yes
130 4.	.50	В	7	512+04	2,130,375.66	6,674,332.71	39°00'40.814"N	N 121°36'12.492"W	WCorp of Engineers Star Bend Road Relief Well Pump Station south 15" Steel Discharge Pipe Crossings	510+37 to 546+00 Cutoff Wall	The pipeline meets the elevation requirement over 200 year WSEL based on the as-built information and type of pipe meets Title 23 requirements. Does not require any work. It does not meet 1957 criteria	SD(P)	3.7	66.25	67.50	71.20	62.77	66.06 7	0.59 66.	37 no peri	mit no ued		USACE	1325 J Street, Sacramento, CA	yes	yes
131 4.	.50	В	7	510+97	2,130,288.81	6,674,393.77	39°00'39.904"N	N 121°36'11.680"W	V 12 kv power line crossing of levee	510+37 to 546+00 Cutoff Wall		EL	ОН			72.22				50	072 yes, co	nd 5 1965	Pacific Gas & Electr	One Tower, Spear Tower, San Francisco, CA	yes	yes
4.	.49	В	6/7	510+37					Reach 6/7 Transition															94105		
132 4.0- 4.19			6	510+50			Not Verified	i	To retain a 12 kv overhead service line and four power poles in the right bank overflow area of the Feather River.	No Rehabilitation Required		EL	ОН							157	786 no	1992	Pacific Gas & Electr	One Tower, Spear Tower, San Francisco, CA	yes	yes
133 4.	.48		6	510+36	2,130,239.19	6,674,428.41	39°00'39.435"N	121°36'11.304"W	W Volcano Vista Farms 18 inch steel irrigation discharge pipe crossing of levee	No Rehabilitation Required	The pipeline meets the elevation requirement over 200 year WSEL based on the as-built information and type of pipe meets Title 23 requirements. Does not require any work	IR(P)	4.0	68.08 rd	69.6 est	73.64	62.75	66.05 7	0.57 66.	35 184	438 yes. Co	id 19 2009	Volcano Vista Farms	P.O. Box 9, Meridian, CA 95957	yes	yes
134 4.	.08		6	510+30					To install 20 hp irrigation pump and to retain an existing walnut orchard (35 acres) all on the right bank of the Feather. Now owned by Volcano Vista Farms and located on Tudor Mutual Pump Station (relocated nipeline part of permit 18438)	No Rehabilitation Required		IR(P)								105	yes, coi	d 13 1975	John R. Johnson/M.I Gilbertson	. 8104 Garden Highway, Yuba City, CA 95991	по	no
135 4.	.48		6	510+25	2,130,230.41	6,674,434.54	39°00'39.345"N	121°36'11.232"W	W Tudor Mutual Water Company North 30 inch steel irrigation discharge pipes crossing of levee	No Rehabilitation Required	The pipeline meets the elevation requirement over 200 year WSEL based on the as-built information and type of pipe meets Title 23 requirements. Does not require any work	IR(P)	4.2	66.92 rd	69.5 est	73.68	62.75	66.05 7	0.57 66.	35 184	437 yes. Co	nd 19 2009	Tudor Mutual Water Company	280 Wilkie Avenue Yuba City, CA 95991	e, yes	yes
136 4.	.48		6	510+20	2,130,222.24	6,674,437.45	39°00'39.306"N	121°36'11.196"W	V Tudor Mutual Water Company South 30 inch steel irrigation discharge pipes crossing of levee	No Rehabilitation Required	The pipeline meets the elevation requirement over 200 year WSEL based on the as-built information and type of pipe meets Title 23 requirements. Does not require any work	IR(P)	4.1	66.92 rd	69.5 est	73.57	62.75	66.05 7	0.57 66.	35 184	437 yes. Co.	id 19 2009	Tudor Mutual Water Company	280 Wilkie Avenue Yuba City, CA 95991	e, yes	yes
4.	.27		6-				levee removed	d	12 inch steel pipe through levee (this pipeline removed as part of 2009 setback levee)	No Rehabilitation Required										pre-19	955	part of o			no	no no
4.	.25		6-				levee removed	d	12 kv power line crossing of levee (this portion of levee removed in 2009 as part of Setback Levee)	No Rehabilitation Required										25	502 yes, co		Pacific Gas & Electr	One Tower, Spear Tower, San Francisco, CA	no	no
4.	.18		6-				levee removed	d	12 kv power line crossing including 9 power poles and 3 anchors- (appears to cover permit 2502 and 5072)	No Rehabilitation Required								\dashv		105	552 yes, con	d 13 1975	Pacific Gas & Electr	94105 One Tower, Spear Tower, San	no	no
4.	.15		6-				levee removed	d	Abandon 14 inch pipe (this pipeline removed as part of 2009	No Rehabilitation Required		IR(P)	4.1					\perp		pre-15	955	part of c		Francisco, CA 94105	no	no
127 2 0	\perp		6	E00 - 00					setback levee project). Listed as 10" Steel in original 1955 O&M-manual. To clear, level, and plant a peech probability on approximately, 170.	No Dobokilitation Desired		T							_	100	122 C	O&M 1		Ports 2 P - 2510		
137 3.8- 4.0 138 3.75			6	508+00					To clear, level, and plant a peach orchard on approximately 170 acres on the right bank of the Feather River. 3,400 lineal feet of setback levee and removal of 4,500 lineal feet of	No Rehabilitation Required No Rehabilitation Required		Trees									033 yes. Co 191 yes. Co		Mark Teesdale Levee District No. 1	Route 2, Box 2518, Oroville, CA 95965 243 Second Street,	no no	no
4.50			J						5,400 lineal reet of setback levee and removal of 4,500 lineal reet of existing levee	130 Renaomitation Required										181	yes. Co	2009	Levee District NO. 1	Yuba City, CA 95991	110	40
	.76	A	5/6	478+68			\$V . FT 15	1	Reach 5/6 Transition	45C 00 to 470 CO C		T										.15	Lucan i	73771		
	.70	Δ.	5	475+00			Not Verified	1	River downstream from Star Bend	456+00 to 478+68 Cutoff Wall and 200 foot Seepage Berm		Trees								66	541 yes, co	nd 5 1969	Leo Gildersleeve	8104 Garden Highway, Yuba Citv. CA 95991	no	no
		A	5	461+00 460+11	2,125,845.57	6,676,268.36	38°59'55.716"N	V 121°35'48.216"W	Urban (200 year) North - Nonurban (100 year) South Transition W Abandon 8" steel drainpipe	456+00 to 478+68 Cutoff Wall and 200	Not sure if the abandonment meets title 23	IR(A)	4.1			68.10	60.79	64.06 6	3.37 63.	77 pre-19	955	part of o	rig		yes	yes
										foot Seepage Berm	requirements. Pipe may need to be properly abandoned or completely removed.											O&M 1				

				Location (NAD 83)	Location ((WGS 84)					Elevati	ions (NGVD 19	988) V	Vater Sur	face Elevati	on (NGVD 19	988)	CVFPE	Permit Inform	mation	Owner Info	ormation	1	
Levee Mile	SBFCA Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Type	cover	Invert of Pipe	Top of T				500 Yr D		it No.	Require Permittee to	Year	Name	Address	verified	Picture Taken
41 3.09	A	5	442+80	2,124,212.69	6676803.8		Abandon 8" steel drainpipe	456+00 to 478+68 Cutoff Wall and 200 foot Seepage Berm	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly	IR(A)	4.1				60.24	63.47	67.69	63.12 pre	-1955	Relocate	part of orig O&M 1955			yes	yes
42 2.95	A	5	433+50	2,123,304.56	6,677,004.67	38°59'30.780"N	121°35'39.072"W Power line across levee to service pole with meter on waterside	410+67 to 478+68 Cutoff Wall	abandoned or completely removed.	EL														yes	yes
43 2.60	A	5-	417+66 N	ot Verified		pipe removed	slope of levee Abandon Existing 24 inch pipe through levee. The permit was	410+67 to 478+68 Cutoff Wall		SD(G)								-		yes, cond 5	part of orig	Levee District No. 1	243 Second Street,	no	no
							revised to removal of 24 inch via 4666A so there should not be any- pipe.	-										(insta	11) and 4666 move)		O&M 1955 and 1964		Yuba City, CA 95991		
2.49	A A	4/5	410+67 410+53	2,121,173.09	66,776,661.21	38°59'09.036"N	Reach 4/5 Transition 121°35'31.038"W Power line crossing to Feather Water District Pumps	Cutoff Wall		EL	ОН								4464	yes, cond 5	1963	Pacific Gas & Electric	One Tower, Spear	yes	yes
				, ,																,.,			Tower, San Francisco, CA	, , ,	
45 2.47	A	4	409+84	2,121,105.29	6,677,660.77	38°59'09.036"N	121°35′31.038″W To install a 2 inch electrical conduit through the levee. The conduit will be buried in the levee slopes and through the crown with one foot of cover. The conduit will provide electrical service to an existing pumping plant in the floodway of the Feather River.	Cutoff Wall	Not sure if the conduit meets the elevation requirement over 200 year WSEL. The type of conduit may or may not meet Title 23. Need to pothole to verify.	EL	2.0			66.20	59.08	62.19	66.19	62.09	7322	yes, cond 5	1971	Feather Water District	280 Wilkie Avenue, Yuba City, CA 95991	yes	yes
46 2.47	A	4	409+66	2,121,086.77	6,677,660.88	38°59'08.25"N	121°35'30.876"W Feather Water District South Pump Station 1-18" irrigation discharge pipes. The improvements include a reservoir at the landside toe of levee and a inlet channel from river to waterside toe.	Cutoff Wall	Pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to verify.	IR(P)	0.8	64.10	65.60	66.40	59.08	62.18	66.18	62.08	5313	yes, cond 5	1966	Feather Water District	280 Wilkie Avenue, Yuba City, CA 95991	yes	yes
47 2.47	A	4	409+62	2,121,082.47	6,677,660.77	38°59'08.789"N	121°35'30.876"W Feather Water District South Pump Station 1-18" irrigation discharge pipes. The improvements include a reservoir at the landside toe of levee and a inlet channel from river to waterside toe.	Cutoff Wall	Pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to verify.	IR(P)	0.9	64.05	65.55	66.40	59.08	62.18	66.18	62.08	4228	yes, cond 5	1963	Feather Water District	280 Wilkie Avenue, Yuba City, CA 95991	yes	yes
48 2.47	A	4	409+58	2,121,078.48	6,677,660.82	38°59'08.748"N	121°35'30.872"W Feather Water District South Pump Station 1-18" irrigation discharge pipes. The improvements include a reservoir at the landside toe of levee and a inlet channel from river to waterside toe.	Cutoff Wall	Pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to verify.	IR(P)	0.8	64.10	65.60	66.40	59.08	62.18	66.18	62.08	4228	yes, cond 5	1963	Feather Water District	280 Wilkie Avenue, Yuba City, CA 95991	yes	yes
49 2.41	A	4	409+55	2,121,075.08	6,677,660.80	38°59'08.668"N	121°35'30.885"W Taylor Brothers Farm Irrigation Pump Station. A inclined pump located on the waterside slope of levee with 14 Inch Pipeline through levee	Cutoff Wall	Pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to verify.	IR(P)	1.4	63.83	65.00	66.40	59.07	62.17	66.17	62.08	4568A	yes, cond 5	1965	George E. Taylor	182 Wilkie Avenue, Yuba City, CA 95991	yes	yes
50 2.47	A	4	409+50	2,121,069.88	6,677,660.77	38°59'08.721"N	121°35'30.870"W Feather Water District South Pump Station 1-18" irrigation discharge pipes. The improvements include a reservoir at the landside toe of levee and a inlet channel from river to waterside toe.	Cutoff Wall	Pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to verify.	IR(P)	1.7	63.25	64.75	66.40	59.08	62.18	66.18	62.08	4228	yes, cond 5	1963	Feather Water District	182 Wilkie Avenue, Yuba City, CA 95991	yes	yes
51 2.40	A	4	407+72	2,120,892.86	6,677,656.42	38°59'08.668"N	121°35'30.885"W Abandoned pipe and structure at landside toe, pipe is 8 inch, but the headwall appears that it is ran through a larger older pipe possibly and old drainage pie	: Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed.	IR(A)	21.8	43.87	44.70	66.50	59.00	62.09	66.08	62.01						yes	yes
52 2.21	A	4	396+32	2,119,752.28	6,677,651.86	38°58'55.692"N	121°35'31.050'W 8 inch pipe crossing. Headwall at land toe, art on land side of crown, and cut pipe near water side toe	Cutoff Wall	ananoned or completely removed. Not sure if the pipeline meets the elevation requirement over 200 year WSEL. The type of pipe may or may not meet Title 23. Need to pothole to	IR(A)	4.1	61.74	62.40	66.50	58.59	61.63	65.52	61.54 pre	-1955		part of orig O&M 1955			yes	yes
53 1.84	A	4	386+63	2,118,786.69	6,677,704.40	38°58'46.170"N	121°35'30.504"W Abandon 8 inch pipe crossing, stand pipe on land toe has been destroyed.	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR(A)	4.6			66.10	58.29	61.29	65.12	61.07 pre	-1955		part of orig O&M 1955			no	no
54 1.51	A	4	365+00	2,116,703.78	6,678,265.36	38°58'25.482"N	121°35′23.46″W Abandon 8 inch pipe crossing, stand pipe on land toe has been removed.	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find	IR(A)	4.8			65.10	57.71	60.66	64.40	59.97 pre	-1955		part of orig O&M 1955			yes	yes
55 1.00	A A	3/4	342+27 300+66	2,114,521.83	6,678,856.40	38°57'22.128"N	121°35′08.814″W Irrigation Production Well (located xx foot west of levee toe) Reach 3/4 Transition	Cutoff Wall		IR(W)														no	yes
56 0.34		3	298+89	2,110,314.83	6,679,535.86	38°57'22.204"N	121°35′07.763″W Removal of a portion and filling with concrete a portion of an abandoned 36 inch steel pipe through the right bank levee of the	Cutoff Wall		IR(G)								-	e-1955 II) and	yes, cond 5	part of orig O&M 1955	Levee District No. 1	243 Second Street, Yuba City, CA	yes	yes
.57 0.36	A	3	298+67	2,110,292.12	6,679,458.78	38°57′22.218″N	121°35′08.814″W Garden Highway Mutual Water - Irrigation Production Well (located 30 foot west of levee toe)	Cutoff Wall		IR(W)									4007		2009	Garden Highway Mutual Water Company	12755 Garden Highway, Yuba City, CA 95991	yes	yes
58 0.35	A	3	298+38	2,110,262.81	6,679,553.51	38°57′21.757″N	121°35'07.763"W Garden Highway Mutual Water 54 inch Irrigation Pump Station Discharge Pipeline through Levee. The improvements include a inlet channel from the river to the 200 feet from waterside toe of levee and irrigation canal at the toe of the landside of levee.	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and gate valve at pump. Pumping up and over levee does not appear to be feasible.	IR(G)	25.1	38.00		63.90	55.88	58.57	61.86	57.78 pre	-1955			Garden Highway Mutual Water Company	12755 Garden Highway, Yuba City, CA 95991	yes	yes
1 4.05	A A	3	280+90 219+00	Not Verified		Not Verified	State Maintenance Area 3 / Levee District No. 1 Levees Transition 12 inch pipe. Appears to be removed by pipe laying on ground	Cutoff Wall	Not sure if the abandonment meets title 23	IR(A)		59.2			55.23	57.92	61.19	56.15 pre	-1955		part of orig			no	no
							adjacent to location		requirements or elevation requirements. Could not find pipe.	Ì		(USED))					•			O&M 1955				
4.01 2 3.84		2/3	218+66 209+89	2,101,737.07	6,678,031.40	38°55'57.543"N	Reach 2/3 Transition 121°35'27.300"W Electrical service crossing for pump	181+00 to 218+66 Cutoff Wall and 100		EL	ОН			62.29										yes	yes
3 3.83	A	2	209+23	2,101,673.35	6,678,014.21	38°55'56.918"N	121°35'27.543"W Private Irrigation Pump Station. 14 inch welded steel pipe crossing			IR(P)	3.0	59.37 est	60.20	62.90	55.17	57.86	61.13	56.00	1730	yes, cond 3	1952	Robert Crandall	Bogue Road, Route	yes	yes
4 3.70 -	A	2	217+00				National Audubon Society. To plant approximately 4,000 native	foot Seepage Berm 181+00 to 218+66 Cutoff Wall and 100	year WSEL. The type of pipe may or may not meet Title 23. Need to nothole to verify.	Trees									17012	yes, cond 17	2000	National Audubon Society	1, Yuba City, CA 95991 v 555 Audubon Place,		
4.25		2	217.00				trees on 40 acres within the right bank overflow area of the Feather River	foot Seepage Berm		Tr									16017	121	1000	No. 2 A - I I - C - 2 A	Sacramento, CA 95825		
5 2.9- 5.19	A	2	217+00				National Audubon Society. To plant approximately 300 to 500 native trees (primarily cottonwoods) on the right bank overflow area of the Feather River.	181+00 to 218+66 Cutoff Wall and 100 foot Seepage Berm	<u>'</u>	Trees									16817	yes, cond 21	1998	National Audubon Society	555 Audubon Place, Sacramento, CA 95825		
6 3.18	A	2	174+91	Not Verified		Not Verified	12 inch pipe	129+66 to 181+00 Stability Berm and 100 foot Seepage Berm	Not sure if the abandonment meets title 23 requirements or elevation requirements. Could not find pipe.		4.5				54.73	57.40	60.61	55.57	_					no	no
7 2.19-		1/2	129+66 125+00				Reach 1/2 Transition To level 60 hectares of leered land westward of the right bank of the	e Cutoff Wall		Struc									8638.	une cond 12	1982	Nevis Land Co. now	1416 9th Street,	Voc	1100
3.00	A	_ 1	123+00				Feather River upstream of the SR 99 Bridge	Cuton wan		Struc					_				8638, 13343, 12590	yes, cond. 13	1702	owned by DFG	Sacramento, CA 95814	yes	yes
8 2.19	A	1	124+32	2,094,124.90	6,679,433.55	38°54'42.235"N	121°35′09.990″W Hamatani Ranch - Sacramento Avenue Irrigation Pump Station and pipeline crossing	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and gate valve at pump. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent design.	IR(P)		32.01		60.39	53.53	56.08	59.07	53.55	3284	yes, cond 4		T.H. Richards now owned by Odysseus Farms PTN		yes	yes
9 2.19	A	1	124+32	2,094,124.90	6,679,433.55	38°54'42.235"N	121°35′09.990″W 24 inch culvert pipe. Part of Sacramento Avenue Irrigation Pump Station	Cutoff Wall	The pipeline does not meet title 23 requirements and will need a positive shut-off structure installed and gate valve at pump. Pumping up and over levee does not appear to be feasible. Should be part of 30 percent design.	IR(P)	26.0	32.01		60.39	53.53	56.08	59.07	53.55 pre	-1955			T.H. Richards now owned by Odysseus Farms PTN		yes	yes
10 2.10	A	1	124+21	2,094,115.32	6,679,426.80	38°54'42.141"N	121°35′10.076″W 12 kv overhead electrical crossing	Cutoff Wall		EL	ОН			60.31								Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	yes
11 1.85	A	1	107+21	2,092,674.99	6,678,527.08	38°54'27.944"N	121°35'21.542"W Remaining abutment for old Nicolaus Bridge	Cutoff Wall		Bridge				60.80	\dashv							County of Sutter	94105 1160 Civic Center	yes	yes
											Ì												Blvd, Yuba City,		

					Location ((NAD 83)	Location	(WGS 84)					Elevation	ons (NGVI	1988)	Water St	urface Elev	ntion (NGVD 1988	CV	PB Permit Info	rmation	Owner Info	rmation	1	
Leve		BFCA Phase	SBFCA Reach	SBFCA STA	Northing	Easting	Latitude	Longitude Encroachment	Proposed Levee Improvement	Required Improvement Work	Туре	cover	Invert of Pipe	Top of Pipe	Top of Levee	100 Yr	200 Yr	500 Yr DWF 1957		Require Permittee to Relocate	Year	Name	Address	verified	Pictur Takei
!		A	1	105+00			Not Verified	To construct three 1 acre ponds on the right bank overflow area of the feather River	Cutoff Wall		Struc								1673	в по	1997	Department of Fish and Game	1701 Nimbus Road Suite A, Rancho Cordova, CA 95670		
	,	A	1	99+00				Hamatani Ranch Irrigation Canal - Station 99+00 to 107+00	Cutoff Wall		IR(G)											T.H. Richards now owned by Odysseus Farms PTN		no	no
1.0	50	A	1	98+00	2,092,080.61	6,677,794.3	8 38°54'22.101"N	121°35'30.845"W State Route 99 Crossing of Levee -To install two removable barriers on the roadway shoulders at the SR 99 crossing of the right bank of levee crown of the Feather River.	Cutoff Wall		Bridge				62.03				1428	o no	1986	Caltrans	703 B Street, Marysville, CA 95901	yes	ye
1.0	50 .	A	1	97+61	2,092,071.07	6,677,788.9	6 38°54'22.007"N	121°35′30.914″W U.S. Communication cable	Cutoff Wall	Not sure if the conduit meets the elevation requirement over 200 year WSEL. The type of conduit may or may not meet Title 23. Need to pothole to verify.	TL	3.0			61.04				351	l				yes	yes
1.2- 2.7		A	1	74+00			Not Verified	To install two sections of 12KV three phase power lines, approximately 2.3 kilometers in combined length, to provide service for irrigation pumps. The project is located in the overflow area at the right bank levee of the Feather River running north and south of the Garden Highway crossing and over the Nelson Slough	Cutoff Wall		EL OI	Н							1340	yes, cond 13	1982	Pacific Gas & Electric	5555 Florin-Perkins Road, Sacramento, CA 95826	s no	no
1.2	20	A	1	73+39	2,090,564.35	6,675,895.4	6 38°54'07.197"N	121°35′54.953″W 12 kv overhead electrical crossing	Cutoff Wall		EL OI	Н			56.04				248	yes, cond 4	1957	Pacific Gas & Electric	One Tower, Spear Tower, San Francisco, CA	yes	ye
1.2	20	A	1	72+27	2,090,511.86	6,675,799.0	8 38°54'06.682"N	121°35'56.176"W Transmission Line Crossing - East Line	Cutoff Wall		EL O	Н			55.83						2008	WPA	114 Parkshore Drive, Folsom, CA 95630-4710	yes	У
1.2	20	A	1	71+89	2,090,504.83	6,675,762.3	1 38°54'06.614"N	121°35'56.641"W Transmission Line Crossing - West Line	Cutoff Wall		EL O	Н			55.64						2009	WPA	114 Parkshore Drive, Folsom, CA 95630-4710	yes	ye
0.8	80 .	A	1	52+25	2,091,015.74	6,673,876.4	1 38°54'11.746"N	121°36′20.470″W Hamatani Ranch Storm Drainage Pump Station. The pump discharge is a 20 inch pipe and pump is Bryon Jackson 17H0H with 50 HP electrical motor.	Cutoff Wall	The pipeline is appears to meet the elevation requirement over 200 year WSEL based on the record information and type of pipe may or may not meet Title 23. Should be part of 30 percent design.	SD(P)	3.0	49.35 rd	51.02 rd	56.34	50.43	52.76	55.28 48	84 1362	yes, cond. 13	1983	Danna & Danna Inc. now owned by Odysseus Farms PTN		yes	ye
0.8	80	A	1	52+25	2,091,015.74	6,673,876.4	1 38°54'11.746"N	121°36′20.470″W 2-18 inch steel pipes with concrete "U" headwall at waterside toe.	Cutoff Wall	Not sure if the abandonment meets title 23 requirements. Pipe may need to be properly abandoned or completely removed. Could not find nine	SD(G)	32.0	24.0 (USED)						pre-195	5		Danna & Danna Inc. now owned by Odysseus Farms PTN		yes	yes
0.0	. 00	A	1	10+82	2,088,598.75	6,670,597.3	1 38°53'47.993"N	121°37'02.081"W To install canal gates on two existing 48 inch CMP culverts under a spur levee on the right bank overflow area of the Feather River	Cutoff Wall		IR(G)	32.0			54.48				1350	yes, cond. 13	1982	Nevis Land Co. now owned by DFG	1416 9th Street, Sacramento, CA 95814	yes	ye
0.0	00	A	1	10+60				Hamatani Ranch Storm Drainage Ditch - Station 10+60 to 68+25	Cutoff Wall		IR(G)	32.0			54.48				1350	5	1982	Nevis Land Co. now owned by DFG	1416 9th Street, Sacramento, CA 95814	yes	ye
0.0	00	A	1	10+00				Begin Reach 1																/	

Part of TO 6 Contract	SD(G)	Storm Water - Gravity
	SD(P)	Storm Water - Pressure
Part of TO 5 Contract	WW(G)	Waste Water - Gravity
	WW(P)	Waste Water - Pressure
Part of TO 4 Contract	IR(G)	Irrigation Line - Gravity
	IR(P)	Irrigation Line - Pressur
Encroachment but not part of MHM work - Redline HDR or WR Plans	RW (P)	Raw Water - Pressure
	W(P)	Water Line - Pressure
	RD	Roadway Crossing
	GL	Gas Line
	TL	Telephone
	EL	Electric Line

Appendix H

Public Health and Hazards: EDR Data Map Environmental Atlas

ENVIRONMENTAL SITE ASSESSMENT SUTTER BASIN FEASABILITY STUDY SUTTER AND BUTTE COUNTIES, CALIFORNIA

1.0 SUMMARY

This report presents the results of an Environmental Site Assessment (ESA) performed during June/July of 2009 by the Environmental Design Section (EDS) of the U. S. Army Corps of Engineers (USACE), Sacramento District. This ESA identified numerous sources of possible contamination due to Hazardous, Toxic, or Radioactive Waste (HTRW) during records research and site investigation.

Data research showed 85 sources of potential contamination within 1/4 mile of the project boundaries. The breakdown of these sources is as follows:

- 51 registered underground storage tanks (UST's) and 3 aboveground storage tanks (AST's).
- 5 sources are listed as small and large generators of EPA regulated hazardous waste.
- 5 sites that had leaking UST's, 2 which have/had affected public drinking water
- 6 known or potential hazardous substance sites under investigation or cleanup
- 2 Waste discharge systems
- 2 Landfills
- 12 suspected drug labs
- 1 pesticide-producing facility

For the majority of the sources, no records were found to indicate that these potential sources have actually caused major contamination, although there are still on-going investigations. For the purpose of this investigation, there are several areas of concern in the event of flooding. Most involve registered UST's, hazardous waste generators, minor tank leaks, UST removal and remediation, and accidental releases.

This Environmental Site Assessment (ESA) did not confirm any known contamination due to Hazardous, Toxic, or Radioactive Waste (HTRW) within the construction zone during records research and field survey.

No field investigation or records review found any evidence to indicate that any other potential sources of contamination would interfere with any planned construction of the levees.

2.0 INTRODUCTION

2.1 Scope of Report

The purpose of this ESA is to identify recognized environmental conditions, including the presence or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or the material threat of a release into structures, the ground, groundwater or surface waters of the property. This report addresses HTRW within the study area which may affect construction for levee repairs on the Sutter Bypass within the Sutter Basin project. This report was prepared in accordance with ASTM E-1527-94, ER 1165-2-132; Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects; and EC 1105-2-206, Project Modifications for Improvement of the Environment. A data search and an on-site investigation were conducted in order to compile information for this ESA. This assessment did not include sampling or analysis of soil or groundwater.

3.0 PROJECT DESCRIPTION

The focus of this feasibility study is to recommend a plan for flood damage reduction, ecosystem restoration, and recreation in accordance with the Water Resource Council's Principles and Guidelines, and Corps civil works planning policies. The purposes of this PMP revision are to redirect the study to focus on the Sutter Bypass - Feather River sub-basin, to apply the Corps' current levee standards, and to incorporate ecosystem restoration and recreation into the study. Results of the State's geotechnical analysis will be used to define without-project conditions,

including levees that might be at risk of failure.

The study scope will refocus on providing flood damage reduction to the urban areas of Yuba City, Live Oak, Gridley and Biggs in the Sutter Bypass - Feather River sub-basin and developing a flood warning system for the outlying areas of the sub-basin. Other study objectives will include ecosystem restoration and recreation.

Several miles of levees along the Feather River upstream of Yuba City protect close to 30,000 residential homes, 1500 commercial structures, 620 farm houses and buildings, and 120 semipublic structures from devastating floods. Much of these levees are inadequate for the desired protection of the cities at risk. A flood damage reduction project will enhance the public health, safety and welfare by eliminating damages to single family residences, interruptions to interstate commerce and reducing the impacts to agriculture thereby promoting a safe environment for the residents of Sutter County and the economy throughout California and the surrounding areas.

For this report the project has been divided into seven (7) separate sites for ease of investigating and reporting. For the purpose of this ESA a corridor data search and site investigations were conducted. The corridor will consist of the site description plus 1/4 mile on each side of the site, in accordance to ASTM-E 1527-94. Each Site project description is as follows:

Cherokee Canal - This site starts at the inter section of the Cherokee canal and the Clousa highway. The canal runs northeast to the Richvale Highway, where it turns east until it reaches State Highway 99. The levee runs parallel to the Thermalito Afterbay approximately 3 miles south on Highway 99 until it turns east on Hamilton Road. Approximately 1.7 miles east Hamilton Road dead ends into Larkin Road, where the levee turns northeast and follows Thermalito Afterbay to where it intersecs the feather River. This section is approximately 19.7 miles long.

Sutter Basin, ESA February 15, 2012

Feather River North (Yuba) - This site roughly follows the Feather River from the Thermolita Afterbay to approximately Metteer road or the Butte/Sutter County line. This section of the project covers about 13.5 miles of the levee.

Feather River North (Sutter) – This section starts at the Butte/Sutter county line of the Feather River and goes south along the river to approximately Pease Road. This section is approximately 9.8 miles long.

Yuba City Levee – This section of the levee project starts at Pease Road on the Feather River and goes south through the Yuba City to the confines of the Feather River and the Yuba River. From there it continues south, mostly following the Garden highway to Star Bend Road. This section is approximately 12.5 miles long.

Feather River South – Starting at Star Bend Road this levee section goes south on the Levee Road, which parallels Highway 99. The Levee Road will cross Highway 99 and continue to the Sutter Bypass, where this section ends. This section is approximately 9.3 miles long.

Sutter Bypass – This section of the project starts at the intersection of the Feather River Levee road and the Sutter Bypass Levee Road and goes north along the Sutter bypass for approximately 17.5 miles. This section ends at the intersection of the Sutter Bypass Levee Road and the Wadsworth Canal Levee Road.

Wadsworth Canal – This 4.5 mile section of the project starts at the intersection of the Sutter Bypass and Wadsworth Canal and goes northeast to end at Butte House road.

4.0 SITE DESCRIPTION

4.1 Location

Sutter Basin is located in the north-central part of California. Sutter County's boundaries include the Sacramento River to the west and the Feather River to the east. Its southern boundary is just downstream of the confluence of the Sacramento River with the Sutter Bypass. The Sutter Bypass passes through Sutter County from the northwest and acts as flood relief for the Sacramento River. The Sutter Bypass conveys flood waters from Butte Basin and additional flood waters from the Sacramento River through the Tisdale Bypass, which connects to the Sacramento River downstream from the town of Grimes. The study area will include the Sutter Bypass – Feather River sub-basin of the Sutter Basin, which extends into the south-central

portion of Butte County along the west side of the Feather River. See Appendix A for site map and legend.

4.2 Site and Vicinity Characteristics

The top of the levees are accessible by vehicle but are limited to public access by locked gates. The predominant use adjacent to the land side of levee is agricultural, while the river side is predominately recreational. Within the study area are several dwellings with their out structures. Most of these dwellings are associated with farming operations. The study area also includes several businesses and show up on several data bases, but appear to have no or little impact on the construction site.

4.3 <u>Descriptions of Improvements on the Site</u>

No improvements have been made to the actual levee in recent years, other than general maintenance and flood damage.

5.0 RECORDS REVIEW

The following sources were used in researching the occurrence of HTRW within the study area. The following information was acquired during a records search and phone interviews.

California Environmental Protection Agency

California EPA has set up a web site, www.swrch.ca.gov/~cw/phome/lusts, for the most updated information. This same list was also duplicated in the data base search.

State Water Resources Control Board

The Division of Clean Water Programs, Tanks Unit, sent a list of leaking underground storage tanks (LUSTs) in the study area. This list was duplicated in the database search.

California Department of Toxic Substances Control

A copy of the CalSites database for the study area was faxed, locating areas where hazardous substances have been released or where the potential for release exists. The database mainly covers spills. This same list was duplicated in the data base search. There was no evidence of any spills that would affect this project.

Data Base Review

Environmental Data Resources (EDR) conducted a records research of the study area consisting of 69 federal, state and publicly available data bases. (See Attachment A for a list of the sources plus a definition and a summary of the information stored in each database).

6.0 SITE RECONNAISSANCE AND OBSERVATIONS

In June and July of 2009, Bruce Van Etten from the Environmental Design Section (EDS) of the United States Army Corps of Engineers-Sacramento District (USACE) visited the study area several times. The objective of the site visit is to identify recognizable environmental concerns in connection with the property. Common environmental concerns that were looked for include the following: asbestos; construction and demolition debris; drums; landfill or solid waste disposal sites; pits, ponds or lagoons; wastewater; fill dirt, depressions, mounds, or any artificial structures; PCB containing transformers; and the presence or likely presence of any hazardous substance or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release on the property or into the ground, groundwater, or surface water of the property.

6.1 Cherokee Canal

Four (4) Underground Storage tanks (UST's) were mentioned in the data search and located during the site visit. All four of the UST's are outside of the construction zone for this project.

6.2 Feather River North (Yuba)

This section of the levee project contained:

Four (4) UST's

One (1) landfill

Two reports on the HAZNET database.

- Four (4) Underground Storage tanks (UST's) were mentioned in the data search and located during the site visit. All four of the UST's are outside of the construction zone for this project.

- The landfill that is noted in the data base search is actually a burn dump and is located at the end of Walnut Ave., Biggs, California. The burn dump is owned by the California Department of Fish and Game and has been closed for several years. The burn dump presents no obstacle to this project.

- The HAZNET data base extracts copies of hazardous waste manifest received each year by the DTSC. The two sites that showed up on this data base show that hazardous waste was deposed of properly.

6.3 Feather River North (Sutter)

This section of the levee project contained:

Seven (7) UST's

One (1) waste discharge system

Three reports on the HAZNET database

One RCRA-SQG or small quantity generator.

- Seven (7) Underground Storage tanks (UST's) were mentioned in the data search and located during the site visit. All seven of the UST's are outside of the construction zone and present no threat to this project.

- The HAZNET data base extracts copies of hazardous waste manifest received each year by the DTSC. The two sites that showed up on this data base show that hazardous waste was deposed of properly.

- -Yuba City Prune Dehydrator showed up on the data base search a facility that treats and/or disposes of liquid or semisolid waste. This is an active facility that is considered a minor threat to water quality and has no reclamation requirements associated with it at this time.
- Andermac, Inc. showed up on the data search as a small quantity generator of hazardous waste. A small quantity generator is a facility that generates more than 100 and less than 1,000 kg of hazardous waste during any calendar month and accumulates less than 6,000 kg of hazardous waste at any time. There are no violations against this facility for generation or disposal of their waste.

6.4 Yuba City Levee

This section of the levee project is the most populated and contained:

Thirty three (33) UST's

Five (5) UST's on the Leaking Underground Storage Tank (LUST) list

One (1) landfill

Three (3) Aboveground Storage Tanks (AST's),

Four (4) RCRA-SQG or small quantity generators

One (1) pesticide producer

Three (3) sites on the Spills, Leaks, Investigation, and Cleanup (SLIC) database

Fifty eight (58) reports on the HAZNET database

Eleven (11) sites on the Clandestine Drug Labs (CDL) database

- Thirty three (33) Underground Storage Tanks (UST's) were mentioned in the data search and located during the site visit. All 33 of the UST's are outside of the construction zone and present no threat to this project.
- There are five UST's on the LUST list that are still open and undergoing cleanup. Two of the sites are in remediation and the other three are undergoing site assessments.
- There is one solid waste facility landfill within the project site but is closed and presents no problems to this project.

- Three (3) Aboveground Storage Tanks (AST's) were mentioned in the data search and located during the site visit. All 3 of the AST's are outside of the construction zone and present no threat to this project.
- There are four facilities that showed up on the data search as a small quantity generator of hazardous waste. A small quantity generator is a facility that generates more than 100 and less than 1,000 kg of hazardous waste during any calendar month and accumulates less than 6,000 kg of hazardous waste at any time. There are no violations against these facilities for generation or disposal of their waste.
- The data search shows the Sutter County Department of Agriculture as a registered pesticide producing establishment of insecticide, fungicide, and Rodenticide. There are no violations against this facility for generation or disposal of their waste and product
- The SLIC (Spills, Leaks, Investigation and Cleanup) program is designed to protect and restore water quality from spills, leaks and similar discharges. All three of the sites on this list are considered an open site undergoing site assessments, but are considered low priority. The sites are outside of the construction zone and presents no threat to this project.
- The HAZNET data base extracts copies of hazardous waste manifest received each year by the DTSC. The 58 sites that showed up on this data base show that hazardous waste was deposed of properly.
- Eleven (11) sites showed up on the Clandestine Drug Labs (CDL) database during a records search. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

6.5 Feather River South

This section of the levee project contained:

One (1) site on the Clandestine Drug Labs (CDL) database

- One (1) site showed up on the Clandestine Drug Labs (CDL) database during a records search. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or

does not require additional cleanup work.

6.6 Sutter Bypass

This section of the levee project contained:

One (1) site that showed up on the ENVIROSTOR database.

- The ENVIROSTOR database comes from DTSC and identifies sites that have know contamination or sites for which there may be reason to investigate further. Growers Ag Services, Inc. is considered an open case by the California Regional Water Quality Control Board. A preliminary assessment has been done and no further action is recommended by the EPA. The Central Valley RWQCB (Region 5S) has it listed as a cleanup program site due to presence of discolored soil and pesticide odor noted on site.

6.7 Wadsworth Canal

This section of the levee project contained:

Three (3) UST's

One (1) site on the Spills, Leaks, Investigation, and Cleanup (SLIC) database

- Three (3) Underground Storage Tanks (UST's) were mentioned in the data search and located during the site visit. All 3 of the UST's are outside of the construction zone and present no threat to this project.
- The SLIC (Spills, Leaks, Investigation and Cleanup) program is designed to protect and restore water quality from spills, leaks and similar discharges. The Helena Chemical Company showed up on this list as an open site undergoing a site assessment for potential contamination of fertilizers. The site is outside of the construction zone and presents no threat to this project.

7.0 FINDINGS AND CONCLUSIONS

Based on information gathered during the site visit, data base search, and interviews conducted, there is no apparent HTRW contamination within the study limits.

The results of the interviews and research of available records of known or suspected contaminated sites indicate the potential for HTRW impact from inundation may be significant. The following additional factors should also be considered.

Possible pesticide residuals in the soil due to normal pesticide application.

Possible soil contamination associated with unknown or unregistered UST's and AST's within the study areas.

Based on information gathered during the site visit and data base search there is no apparent HTRW contamination, that is not already documented within the study area, that may affect the proposed project.

APPENDICES

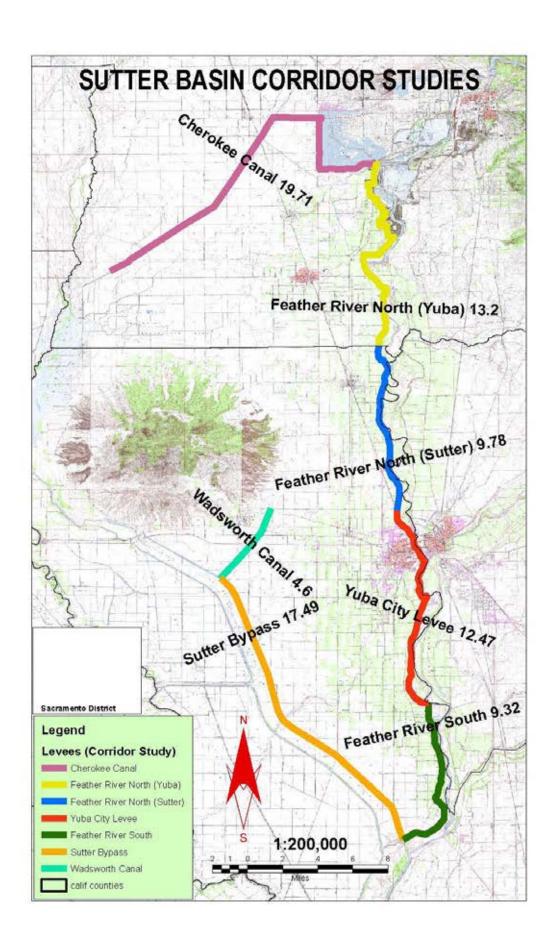
Appendix 1 Site Map Appendix 2 Photos

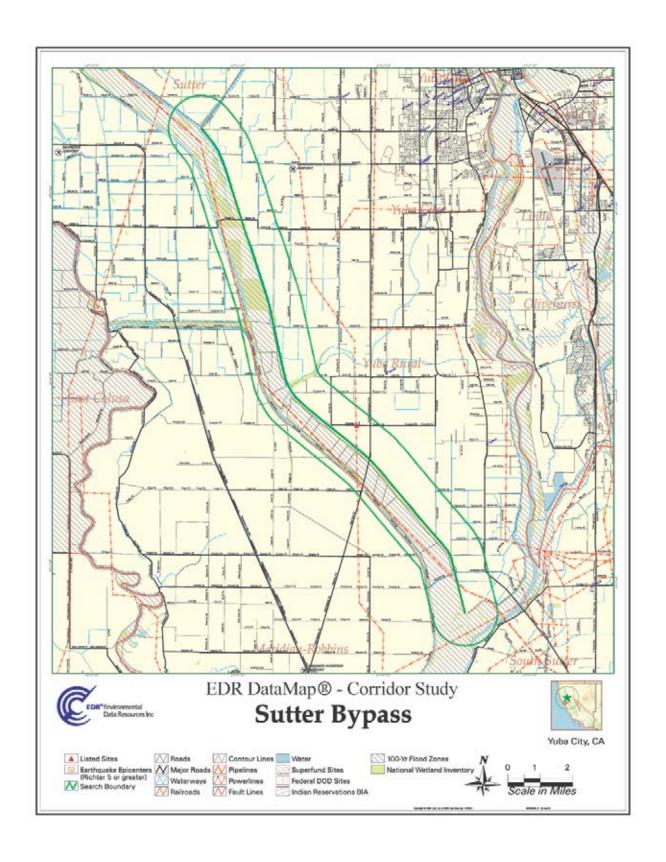
Appendix 3 Regulatory Research Documentation

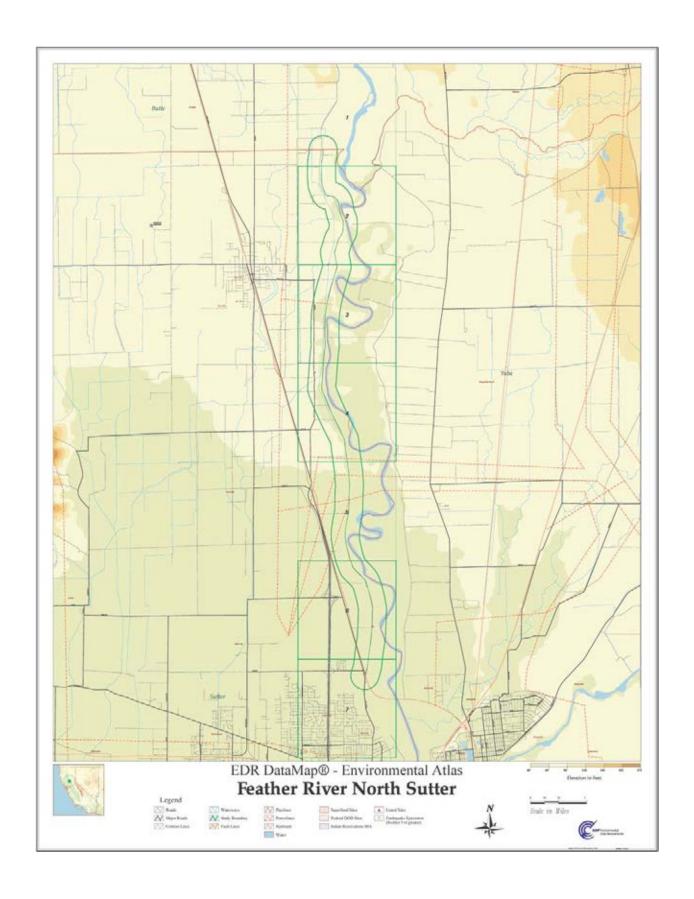
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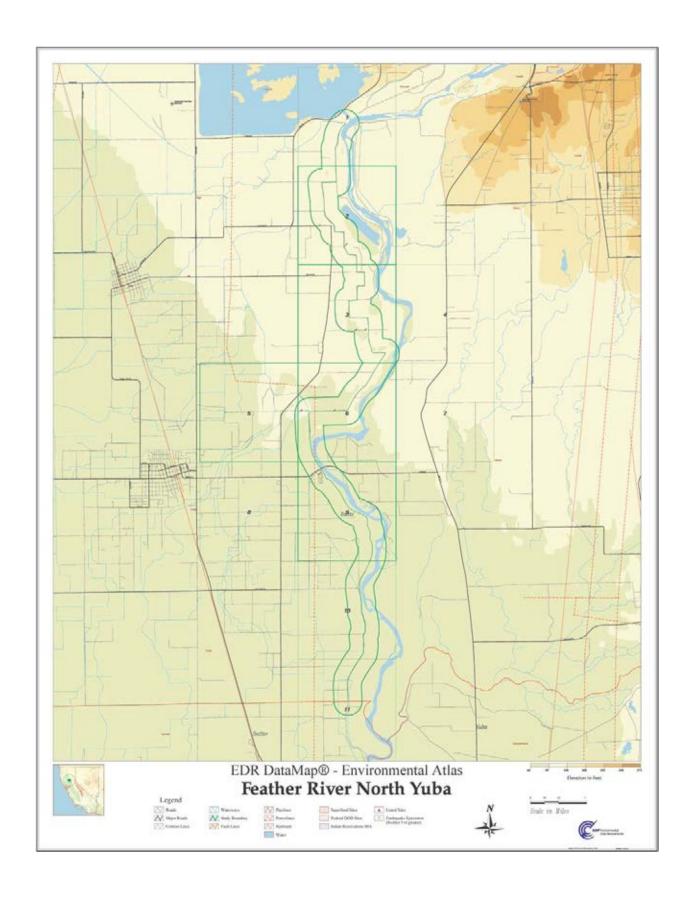
Appendix 1

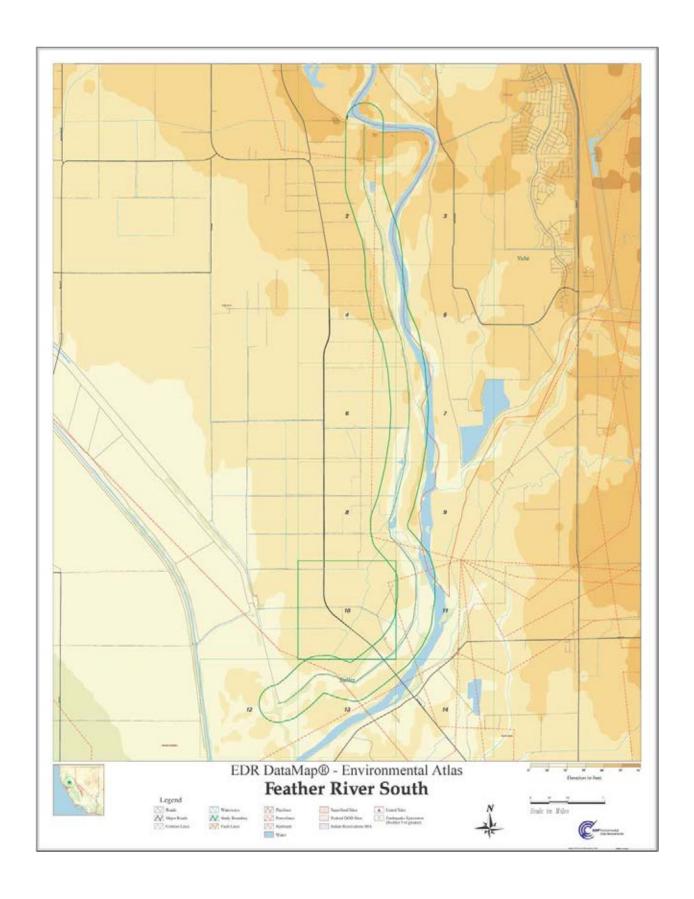
SITE MAPS

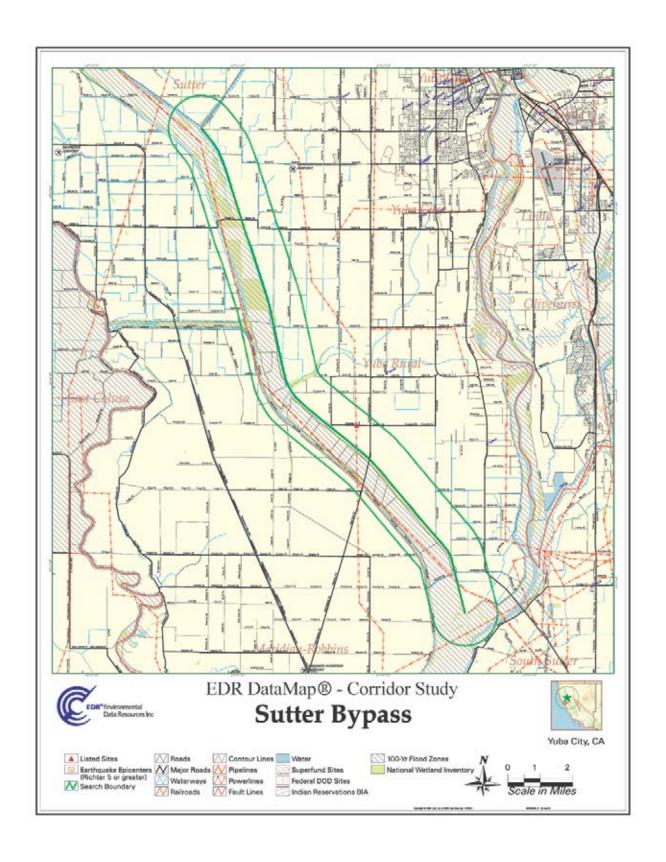


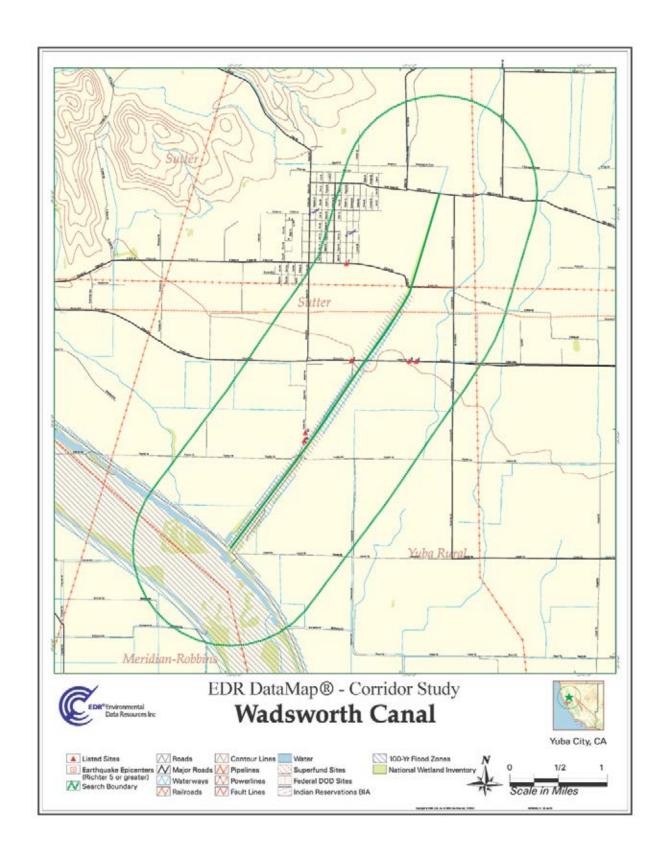


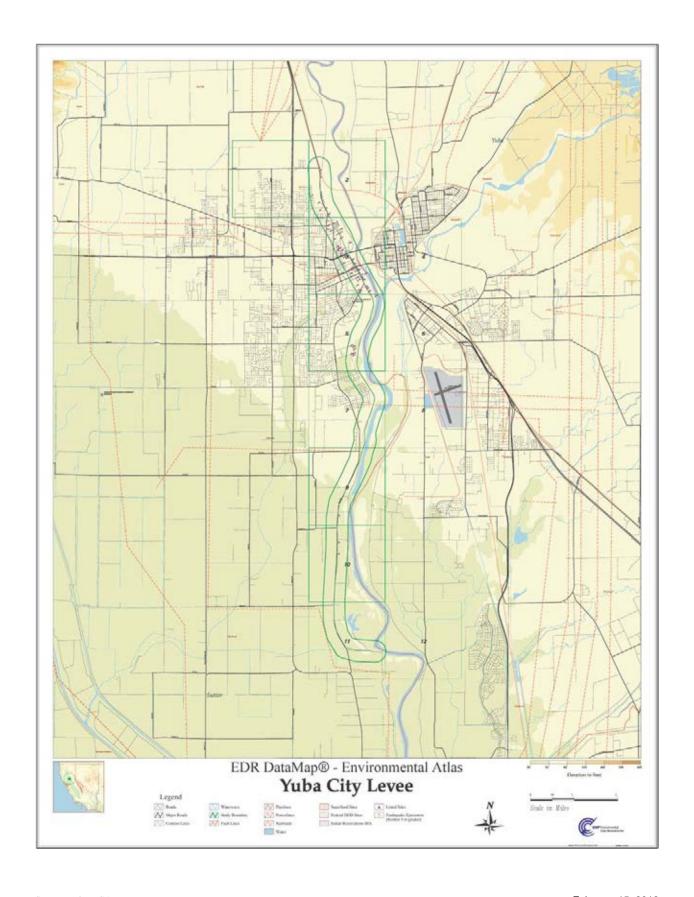












Appendix 2

PHOTOS



Start of the Cherokee Canal, looking NE from the Colusa Highway



Cherokee Canal overcrossing on the Richvale Hwy looking north



Sutter Bypass at Sacramento Ave. on the west side of the canal. Tanks are presumed to hold pesticides but no staining or leaks were visible.





Feather River North (Yuba) at East Gridley Road



Yuba City Levee, 2nd Street Boat Ramp



Yuba City Levee, 2nd Street



Yuba City Levee, 5th Street



Yuba City Levee, B Street



Yuba City Levee Highway 20



Yuba City Levee, Keyser Street



Yuba City Levee, Sutter Street



Yuba City Levee, Teega Ave.



Feather River South, Laura Ave.



Sutter Bypass



Sutter Bypass



Sutter Bypass



Sutter Bypass



Wadsworth Canal, Butte Road



Wadsworth Canal, Highway 20

Appendix 3

REGULATORY RESEARCH DOCUMENTATION

Appendix I

Cultural Context, Native American Correspondence, and Identified Resource Descriptions

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Cultural Context, Native American Correspondence, and Identified Resource Descriptions

This appendix provides information in support of Section 3.17, Cultural Resources. This appendix contains a description of the prehistoric, ethnographic, and historic contexts for the FRLWP, a list of previous cultural resource studies performed in and near the footprint of the action alternatives, a list of properties on the National Register of Historic Places (NRHP) that occur near the action alternatives, as well as records of correspondence with the Native American community. Table I-1 presents a list of acronyms and abbreviations found in this appendix.

Table I-1. List of Acronyms and Abbreviations

APE	area of potential effects
APN	assessor's parcel number
B.P.	before present
CEQA	California Environmental Quality Act
CRHR	California Register of Historic Resources
LD 1	Levee District 1
FERC	Federal Energy Regulatory Commission
kV	kilovolt
MGD	million gallons per day
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
SRFCP	Sacramento River Flood Control Project
USACE	U.S. Army Corps of Engineers
CEQA CRHR LD 1 FERC kV MGD NAHC NRHP SRFCP	California Environmental Quality Act California Register of Historic Resources Levee District 1 Federal Energy Regulatory Commission kilovolt million gallons per day Native American Heritage Commission National Register of Historic Places Sacramento River Flood Control Project

Cultural Context I.1

I.1.1 Prehistoric Context

1.1.1.1 **Feather River Vicinity, Foothills**

The foothill region in the project vicinity corresponds roughly to the ethnographically known Maidu territory, and includes four recognized prehistoric archeological phases: the Mesilla, Bidwell, Sweetwater, and Oroville (Moratto 1984; Selverston et al. 2005).

Dating to approximately 3000-2000 before present (B.P.), the Mesilla Complex is characterized by atlatl projectile points (spear tips), bowl mortars, various shell beads, charm stones, and bone implements. Sites defining this phase apparently reflect seasonal forays into the foothills for hunting and gathering and appear to indicate a Martis influence (Moratto 1984). The Martis culture consists of large atlatl projectile points found at higher altitudes in the Sierra Nevada mountain range.

The Bidwell Complex dates to approximately 2000–1200 B.P., and is defined by milling stones, wooden mortars (inferred from ethnographic sources; none have been found), large slate and basalt points, steatite vessels, and flexed burials. The settlement/subsistence pattern appears to have included permanent villages with surrounding task-specific locations (e.g., hunting, fishing, food processing).

The Sweetwater Complex dates to 1200–500 B.P. Relevant material culture includes shell, bead, and ornament forms; steatite cups; small projectile points (Eastgate, Rose Spring, and Gunther Barbed types); and extended or semi-extended burials.

The Oroville Complex dates to approximately 500–150 B.P. Typical manifestations include bedrock mortars, incised bird bone tubes, gorge hooks, gaming bones, clamshell disk beads, circular dance houses, and tightly flexed burials. This phase ended with the malaria epidemic of 1833, which greatly reduced the Maidu population (Riddell 1978).

I.1.1.2 Valley Prehistory

The prehistoric sequence of the Central Valley has been revised several times, and therefore a variety of terms are used across the relevant literature. Early literature described the prehistoric cultures in terms of different, regional manifestations with unique material culture, called patterns. Frequently used regional divisions refer to Windmiller, Berkeley, and Augustine patterns. The current explanatory framework focuses less on regionally specific aspects and integrates the overall prehistory into a sequence (Bennyhoff and Fredrickson 1994). Bennyhoff and Fredrickson describe the Central Valley prehistory in terms of Early, Middle, and Late Horizons. This revision considers Central Valley prehistory in terms of culture change as a process rather than the more descriptive methods of early literature.

Early Horizon, Pleistocene/Holocene Transition: 12,000-8000 B.P.

Archaeological evidence for human use of the Central Valley during the late Pleistocene and early Holocene is scarce. At the end of the Pleistocene, circa 12,000–8000 B.P., parts of the Sierra Nevada adjacent to the Central Valley were covered with large glaciers, and the valley provided a major transportation route for animals and people. This transportation corridor, perhaps rivaled only by maritime coastal travel, undoubtedly was used heavily by early Californians.

Although rare, the archaeological remains of these activities have been identified in the Central Valley (Ann S. Peak & Associates 1981; Johnson 1967; Treganza and Heizer 1953). Johnson (1967) presents evidence for some use of the Mokelumne River area, under what is now Camanche Reservoir, during the late Pleistocene. A number of lithic cores and a flake were found at three different locations. All lithic specimens were associated with Pleistocene-age gravels. Early research describes this material as part of the Farmington Complex, characterized by core tools and large, reworked percussion flakes (Treganza and Heizer 1953:28). Farther north, at Rancho Murieta, lithic artifacts spanning the reduction sequence, as well as unworked raw material, were recovered from gravel deposits attributed to the late Pleistocene (Ann S. Peak & Associates 1981). However, recent geoarchaeological investigations at CA-STA-69 (in the vicinity of Farmington Complex–type site CA-STA-44) identified Farmington artifacts at the site within Holocene-age alluvial terrace deposits, not Pleistocene-age deposits. These indicate reinvestigation of the age of the Farmington Complex may associate this archaeological culture with the Holocene (Rosenthal et al. 2007).

Most researchers conclude the Pleistocene and early Holocene human economy focused on large game. Although no direct evidence of this exists in the Central Valley, the similarity of the artifact assemblages to those of other locations in western North America, where the association can be demonstrated, supports this argument. Many large Pleistocene mammals suffered extinction during the Pleistocene/Holocene transition. These extinctions were caused by warming temperatures, rising sea levels, and changing precipitation patterns (Meyer and Rosenthal 2008). The Central Valley gradually became both warmer and dryer. Pine forests were replaced with vegetation similar to that found today. The rising sea level filled what is now the San Francisco Bay and created the Sacramento–San Joaquin River Delta marshes. To survive without large game, people had to change their food procurement strategies to make use of a more diverse range of smaller plants and animals (Moratto 1984).

Early Horizon: 8000-4000 B.P.

As humans altered their subsistence strategy to increase the range of pursued food items, their mobility also increased. Small groups of people probably moved through the valley, foothills, and Sierra Nevada to take advantage of seasonally available resources and resources limited to particular unique environments. The ability to move from resource to resource was a critical element of this subsistence strategy (Rosenthal et al. 2007).

Reliance on a number of diverse smaller plants and animals had several consequences. First, people had to move from one area to another to take advantage of the seasonal availability of particular resources. Second, large areas of land were needed to ensure that enough resources were available during all times of the year. Third, more specialized tools were necessary to procure and process the wider range of plants and animals that were being used. This broad-based strategy continued relatively unchanged until approximately 6000 B.P.

As the population slowly increased, it became increasingly difficult for people to obtain seasonally available resources across large areas of land (Meyer and Rosenthal 2008). Dental pathologies in the burial record reveal dietary stress (Moratto 1978). Growing populations decreased the land available to given cultural units, and thus the suite of resources available to those populations. This pressure resulted in a further expansion of the suite of resources pursued, relative to previous conditions.

Fredrickson (1973) identified archaeological indicators of this expansion in the Windmiller site (CA-SAC-107). Artifacts and faunal remains at Windmiller sites indicate that a diverse range of resources were exploited, including seeds, a variety of small game, and fish. The material culture includes trident fish spears; at least two types of fishhooks; quartz crystals and numerous charm stone styles; and a baked clay assemblage that included net sinkers, pecan-shaped fish line sinkers, and cooking balls. Ground-stone items included mortars and pestles. The bone tool industry appears minimal but includes awls, needles, and flakers. People with a Windmiller adaptation buried their dead in formal cemeteries, both within and separate from their villages, in a ritual context that included the use of red ochre, often rich grave offerings, and ventral extension with a predominantly western orientation (although other burial positions, such as dorsal extension and flexed, and cremations are also known) (Moratto 1984). While the Windmiller pattern is identified with the Sacramento–San Joaquin River Delta, work at Camanche Reservoir has identified sites with Windmiller assemblages (Johnson 1967), indicating that other valley settings also were used by people exhibiting these adaptations.

Middle Horizon: 4000-1500 B.P.

In the Middle Horizon, resource specialization resulting from the expanded subsistence strategy is readily visible in the archaeological record. Dietary expansion was associated with new exploitation of niche environments such as marshlands in the Delta. Acorn procurement from oak trees (*Quercus*, sp.) also increased. The acorn had been used before this time, but it became a much more significant portion of the overall diet breadth, with specialized procurement and processing technologies (Rosenthal et al. 2007). People in this period were more sedentary than they had been in the past, and village sites are found throughout the valley along rivers and near other areas with permanent sources of water (Moratto 1984).

Previous research described the Berkeley Pattern identified at CA-Ala-307 as a typical Middle Horizon site (Fredrickson 1973). Sites displaying Windmiller Pattern assemblages, however, also are found in the Middle Horizon. The Windmiller Pattern sites in this period seem to occur with more frequency in or near the Delta, while Berkeley Pattern sites tend to be more prevalent farther north. The Berkeley Pattern differs primarily in its greater emphasis on the exploitation of the acorn as a staple. This distinction is reflected in the more numerous and varied mortars and pestles. This complex is also noted for its especially well-developed bone tool industry and such technological innovations as ribbon flaking of chipped stone artifacts. During this era, flexed burials replaced extended burials, and the use of grave goods generally declined (Moratto 1984).

A restricted land base, coupled with a more specialized resource base, meant that people had to develop economic relationships with groups of people living in other areas who had different specialized resources. Although resources and commodities were being exchanged throughout the region prior to this period, it is during this period that more extensive and more frequently used economic networks developed. Transported resources likely included foods (trans-Sierra acorn movement is known from later periods) and commodities more visible in the archaeological record such as shell and lithic materials (Moratto 1984).

Late Horizon: 1500-150 B.P.

The Late Horizon archaeological record documents further increases in specialization, sedentary settlement, and exchange networks relative to the Middle Horizon. Population continued to increase, and group territories continued to become smaller and more defined. The Delta region of the Central Valley reached population density figures higher than almost any other area of North America (Chartkoff and Chartkoff 1984). Patterns in the activities, social relationships, belief systems, and material culture continued to develop during this period and took forms similar to those described by the first Europeans that entered the area.

The predominant generalized subsistence pattern during this period is called the Augustine Pattern (Fredrickson 1973). Archaeological sites representing the Augustine Pattern show a high degree of technological specialization. Artifacts in this period include artifacts of composite materials, developed reductive technologies such as stone and shell work, and highly specialized adaptive technologies, including basketwork and ceramic production. Other notable elements of the material culture assemblage include flanged tubular smoking pipes; harpoons; ceramic figurines and vessels (Cosumnes Brownware); clamshell disk beads; and small projectile point types such as the Gunther Barbed series. These small projectile points may indicate the use of the bow and arrow. Complex social and economic institutions also are represented by different access to wealth, the

implementation of a shell money system, and the maintenance of extensive exchange networks (Meyer and Rosenthal 2008).

I.1.2 Ethnographic Context

I.1.2.1 Konkow Maidu

The Konkow Maidu occupied foothills east of Chico and Oroville, as well as a portion of the Sacramento Valley (Riddell 1978). Konkow is one of three languages composing the Maiduan language family of the Penutian linguistic stock. Several dialects of Konkow were spoken from the lower extent of the Feather River Canyon to the surrounding hills and in the adjacent parts of the Sacramento Valley (Shipley 1978).

The Konkow lived in village communities of three to five villages, in round semi-subterranean houses covered with earth. It is estimated that a typical village consisted of about 35 people during ethnographic times. Villages were made up of smaller groups. Family units usually were made up of two to five people. A major village with a large assembly and subterranean ceremonial lodge served as the central ceremonial and political focus for affiliated villages in the vicinity. This central village was not necessarily the most populous village but likely served as the residence of the chief, who lived in the ceremonial lodge. The chief's primary roles were advisor and spokesman. The individual villages were self-sufficient, not under the control of a headman (California Department of Water Resources 2004; Riddell 1978).

In winter, the Konkow settled in widely dispersed patterns along river canyons, usually on ridges high above rivers and generally on small flats on the crest of the ridge, or half way down the canyon side. A village-community owned and defended a known territory, which served as a communal hunting and fishing ground. Some villages were located strategically atop isolated knolls in consideration of attack and defense. The Konkow followed an annual gathering cycle that made it necessary for them to leave their winter settlements on the river ridges. In the summer, they traveled into the mountains to hunt. In the spring, they ventured into the valley areas to collect grass seeds (Riddell 1978).

The Konkow harvested greens, tubers, roots, seeds, nuts, and berries. Although wild rye was common in their diet and pine nuts were highly valued, the most important of the harvested foods were acorns, from black oak (*Quercus kelloggi*) in particular. Konkow burned grass and brush cover to optimize the mix of plants eaten by deer. Fisherman pursued salmon on the Feather River. The Konkow also pursued lamprey eels. Terrestrial game eaten by the Konkow included deer, elk, rabbits, squirrels, and birds such as quail, pigeons, and ducks (California Department of Water Resources 2004; Riddell 1978).

Because the Konkow had no complex political organization, the shaman was an important figure in their society. The shaman occupied a role that combined political, spiritual, and medical functions. The shaman role was passed down as a hereditary office from father to son (Riddell 1978).

The Konkow held an annual mourning ceremony, the Keruk, for the recently deceased, which reenacted the death of the creator, Kukumat. For this ceremony a male and female effigy were created, clothed, and burned. The Konkow also offered money, food, and blankets to the god, through incineration. The Maidu participated in the Kuksu cult, also practiced by the Patwin, Pomo, northern Costanoans, and the Coast and Sierra Miwok. Kuksu, "the south god," renewed the world

each year. The ritual was celebrated in round dance houses by dancers with elaborate costumes, including large feather headdresses (Riddell 1978).

Konkow life was little affected by European contact until the gold rush in 1849. At this time miners descended upon the Feather River and surrounding foothills to remove abundant gold. The miners brought diseases that were deadly to the native peoples, decimating the population. These miners also destroyed the landscape with their mining techniques and violently drove the surviving Konkow from their lands. When the mining craze was over, the miners settled in the area and turned large tracts of land into agricultural fields. Because the miners wanted their land, the Konkow were twice driven off their traditional lands. In 1853, the Konkow, along with other Native American groups, were gathered by force and sent to the Nome Lackee reservation in Tehama County. This was not a successful reservation, and most of the families returned to their original lands. In 1863, the Konkow again were rounded up by militias and driven to the Round Valley Reservation in northern Mendocino County. Many of these families remain in Round Valley today. Around the turn of the twentieth century, the Federal government created rancherias for the Konkow, establishing a limited land base for the tribe and formalizing their tribal status with the Federal government. Today the Konkow are very active in cultural preservation in and around the Palermo/Feather River area. (California Department of Water Resources 2004.)

I.1.2.2 Valley Nisenan

The Feather River West Levee Project encompasses lands associated with the Southern Maidu, or Nisenan. The language of the Nisenan, which includes several dialects, is classified in the Maiduan family of the Penutian linguistic stock (Kroeber 1976; Shipley 1978). The western boundary of Nisenan territory was the western bank of the Sacramento River. The eastern boundary was "the line in the Sierra Nevada mountains where the snow lay on the ground all winter" (Littlejohn 1928).

Nisenan permanent villages usually were located on low rises along major watercourses. Village size ranged from 3 houses to 50. Houses were domed structures covered with earth and tule or grass and measured 3.0–4.6 meters in diameter. Brush shelters were used in the summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule or brush, with a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary used for storing acorns (Wilson and Towne 1978). A Nisenan village, Holloh, was located just outside of the eastern boundary of the project area along the Bear River.

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna provided by the rich valley environment. The Valley Nisenan economy involved riparian resources, in contrast to the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The Nisenan cultivated native tobacco (*Nicotiana* sp.), and also managed wild species through burning. The Nisenan harvested blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*). Acorns could be stored in anticipation of winter shortfalls in resource abundance. Deer, rabbit, and salmon were the chief sources of animal protein in the aboriginal diet, but many other insect and animal species were taken when available.

Religion played an important role in Nisenan life. The Nisenan believe that all natural objects were endowed with supernatural powers. Two kinds of shamans existed: curing shamans and religious shamans. Curing shamans had limited contact with the spirit world and diagnosed and healed

illnesses. Religious shamans gained control over the spirits through dreams and esoteric experiences (Wilson and Towne 1978). The usual mode of burial was cremation (Faye 1923).

The gold rush of 1849 had a devastating effect on the Valley Nisenan. The flood of miners that came to the area in search of gold brought diseases with them that decimated the Nisenan population. Those who survived were subjected to violence and prejudice at the hands of the miners, and the Nisenan eventually were pushed out of their ancestral territory. Although this contact with settlers had a profound negative effect on the Nisenan population, the Nisenan people survive and maintain strong communities.

I.1.3 Historical Context

I.1.3.1 Early Exploration

Spanish exploration of the region began with Gabriel Moraga's forays into the region in 1808. Moraga named one of the area rivers *Rio de las Uvas*, which came to be known as the Yuba River. Hudson's Bay Company trappers later traveled through the region in the 1830s, followed by the expedition led by John C. Fremont in 1846. Sutter County received its name from John A. Sutter, who established Sutter's Fort in Sacramento during the early 1840s and whose Hock Farm and New Helvetia lands included areas of Sutter County (Hoover et al. 1990; Rawls and Bean 2003; Williams et al. 2002).

I.1.3.2 Gold Rush

This region exploded with mining activity during the gold rush, which attracted both American and international settlers. Euro Americans settled the present-day Yuba City/Marysville area intensively during the California gold rush. Beginning in 1849, prospectors and entrepreneurs overran the streams of the Sierra Nevada, including the Feather and Yuba Rivers, in search of riches. Placer miners initially established claims and settlements on watercourses, and then gradually worked back from the flats adjacent to streams to ridges and hillsides.

The flood of 1850 encouraged miners to work areas located above the high-water mark of the Feather and Yuba Rivers. By 1857, hydraulic mining began to replace the placer methods. Hydraulic mining occurred primarily in uplands, while small-scale placer mining operations continued along rivers and streams. Hydraulic mining removed large upland deposits, which were washed into waterways, contributing to disastrous flooding and making waterways un-navigable. The industry went into decline after 1884, when a Federal court outlawed mining debris in rivers in the decision *Woodruff v. North Bloomfield Gravel Mining Company*. Gold excavation in the region was revived with dredge mining operations around Oroville and Honcut after 1900 (Rawls and Bean 2003; Williams et al. 2002).

I.1.3.3 Agriculture and Irrigation

Settlers raised wheat and vegetables in the Yuba City /Marysville area as early as the 1840s. Small-scale hop farming was introduced to the area in 1859. Domesticated cattle and sheep arrived from the Midwest in the early 1850s and multiplied substantially. Agriculture made gains in the region during the 1860s, but in Butte County mining activity increased at the expense of agriculture during the next decade (Rawls and Bean 2003; Williams et al. 2002).

During the 1880s the agricultural economy increased markedly, as a result of two factors. First, the conversion of hydraulic-mining water conduits to irrigation systems, a process dominated by private companies in this region of California, introduced the possibility of transforming otherwise poor land into highly productive agricultural land. Second, the railroad and, by the late 1880s, the refrigerated rail car, encouraged local farmers' participation in a wider range of markets (Rawls and Bean 2003; Williams et al. 2002).

Fruit production became a major element of the regional economy during the last two decades of the nineteenth century. Citrus colonies were organized in Butte County between 1886 and 1895, the most prominent of which were Thermalito, Palermo, and Rio Bonito (Frederich 1974).

I.1.3.4 Settlement of Local Towns

A large portion of the project area was originally included in John A. Sutter's New Helvetia land grant established in 1841. In order to support his settlement in Sacramento, Sutter started a livestock ranch called the Hock Farm near the site of what would become Yuba City. Yuba City was founded in 1849 on land purchased from John Sutter by Samuel Brannan, Pierson Reading, and Henry Cheever. They established a distribution center for supplying the gold rush 49ers. Sam Brannan, as senior partner, had the town site laid out and hired agents to sell lots. During the gold rush, Marysville, on the east bank of the Feather River, overshadowed Yuba City because it was easier for miners arriving by riverboat from San Francisco and Sacramento to reach the gold fields to the east. It was not until after the gold rush was over, and people turned to the fertile land west of the river, that Yuba City began to prosper. Yuba City was established as the county seat by a vote in 1856 and incorporated January 23, 1908 (Rawls and Bean 2003; Williams et al. 2002).

The California and Oregon Railroad established Biggs in 1870, naming the town after the first rancher to ship grain from the region, Major Marion Biggs. By the early twentieth century, the town of Biggs had an established agricultural industry, predominantly producing hemp, alfalfa, berries, vegetables, and grapes. The town incorporated in 1903. From its beginning, Biggs has been associated with municipally owned public utilities—water works and an electricity distribution system purchased to provide Biggs residents with low cost utilities (Sacramento Bee 1953a; Sacramento Bee Annual Edition for 1902; Gudde and Bright 1998).

The Southern Pacific Railroad Company established the town of Gridley in 1870, naming the town after George W. Gridley, the owner of approximately 8,000 acres, 320 of which encompassed the new town. Gridley was a native of Cazenovia, New York, who migrated to California in 1850 in search of gold. In 1853, Gridley settled in Butte County, where he raised sheep and worked as an auctioneer. The city of Gridley grew steadily during the late nineteenth century, and by 1887 the town had a population of roughly 1,500 residents. From its origins, Gridley had a developed agricultural industry, including an established dairy production and a variety of crop output such as grain and fruit (Gudde and Bright 1998:153; Robb 1915; Sacramento Union 1887).

The town of Live Oak was established in 1874. Named by H. L. Gregory, the town grew steadily but slowly, and by 1881 it included a population of 180 residents. Live Oak historically has been an agricultural community, producing crops such as walnuts, peaches, prunes, and grain. Ranching and canning also have been an important part of the agricultural industry in Live Oak. In 1947, the town featured the last of 65 canneries opened by the United States Department of Agriculture during World War II in high schools throughout California. The town incorporated in 1947 with a

population of approximately 1,500 (Gudde and Bright 1998; Sacramento Bee 1947, 1953b, 1966; Sacramento Union 1881).

I.1.3.5 Flood Control and Reclamation

Impacts from hydraulic mining were felt by most communities and farmers in the Sacramento Valley. In the early years of statehood, the Sacramento Valley experienced extensive flooding. In response, private landowners constructed small levees—between 3 and 4 feet high—near their farms. This was a pattern repeated by most landowners along rivers in the Sacramento area. These levees, however, proved ineffective and failed during the catastrophic floods from this early period (Crawford and Herrick 2006:138; McGowan 1961:287; O'Neill 2006:74). As the floods worsened, landowners attempted to build higher levees, but these too proved ineffective (McGowan 1961:288).

California was included in the Federal Swamp Land Act of 1850, which allowed the state to reclaim its wetlands through the construction of levees. The program, however, was riddled with corruption and problems that compounded levee construction (O'Neill 2006:48-50, 52, 73; U.S. Geological Survey 2006). In the early 1860s, as hydraulic mining increased and flooding continued to be a significant problem for farmers in the Sacramento Valley, a concentrated effort at levee construction began. The state legislature tried to coordinate a levee system and control levee construction by creating the Swamp Land Commission. Modeled after districts in Mississippi, the legislation gave California drainage districts, which were permitted to grant the power to construct levees. It would become the responsibility of state engineers to design the levees for each district. By the end of the first year, there were 28 districts. For a multitude of reasons, including more flooding, landowners who refused to pay levee fees, and others who were unable to pay, the system produced only minor tangible results. The legislature enhanced levee district powers in 1864, which spurred more levee construction (O'Neill 2006:81). However, by 1866, after complaints for local control over the districts, the state was no longer planning a centralized levee system. The following year, the region suffered another catastrophic flood when the American River rose so high that it flowed across the Sacramento River and breached the levees on the west side of the river, north of present-day West Sacramento in Yolo County (McGowan 1961:289).

The Green Act boosted levee construction in 1868. The act eliminated the limit on the number of swampland acres allowed under the Federal swampland program and transferred to landowners the task of creating levee districts. Between 1868 and 1871, almost all remaining swampland passed into the hands of private owners (O'Neill 2006:82). During this period, private owners constructed extensive levee systems that were much larger and, combined with the reclamation of swamplands, made flooding more serious (O'Neill 2006:82; McGowan 1961:287).

Levee construction and flood control were compounded in the 1880s and 1890s as the fight between miners and farmers continued. There was also disagreement between the U.S. Army Corps of Engineers (USACE) and the state about USACE's role and authority in the matter. This hindered Federal involvement. Local reclamation districts continued to build levees in a piecemeal fashion, including levees on the west bank of the Sacramento River. These raised the floodplain, protected the local lands, and blocked natural outlets. This created flood problems for residents farther down the river during the first part of the twentieth century.

In 1903 and 1904, the Sacramento River once again flooded. In 1904, a statewide lobbying organization was created for the purpose of generating more work from the state government for river improvement in cooperation with landowners and other government agencies. The governor

created a Board of River Engineers composed of engineers with extensive experience with river management on the Mississippi River. The board recommendation was to relieve stress on the levees by constructing weirs that would temporarily allow excess water to bypass the river channel until a proper channel depth could be achieved. The proposal was rejected by the California Board of Trade, which was pushing for the construction of more levees. This was ultimately the approach adopted by the legislature (O'Neill 2006:94, 104, 106–107).

California continued to lobby the Federal government for help. Another devastating flood in 1907 increased pressure for more Federal funding, but plans for a comprehensive flood control plan stalled after it was learned that the driving force behind the plan was private landowners. It would take until 1911 for California Debris Commission member Thomas H. Jackson to design a comprehensive flood control plan that was more than just constructing levees. This approach was acceptable to the Federal government, and a special session of the state legislature approved California's support and participation in the new flood plan (O'Neill 2006:111, 114–115). Lobbying efforts continued to press the Federal government and finally were successful when the 1917 Flood Control Act was passed. Among other things, the act required USACE to work with state governments and local levee districts and gave \$5.6 million to construct flood control facilities in the Sacramento Valley (O'Neill 2006:125). The act authorized the Sacramento River Flood Control Project (SRFCP), which provided for the construction of more levees and the Yolo and Sutter Bypasses. The SRFCP was the first complete Federal flood control project (Bailey 2007:24; California Central Valleys Flood Control Association 1960; O'Neill 2006:125).

Changes to the act were made in 1928, 1937, and 1941. The projects in the Sacramento Valley were further affected by the Flood Control Acts of 1944, 1950, 1958, and 1960. The SRFCP resulted in 980 miles of levee construction (California Central Valleys Flood Control Association 1960). In 1955, another devastating flood occurred in the Sacramento region. A subsequent investigation exposed structural and functional deficiencies in the levees that could not have been foreseen or tested until a flood occurred. The levees in the Sacramento Valley needed maintenance, which continued to be costly. One reason for the deterioration was thought to be erosion caused by increased pleasure boating on the rivers, which caused waves to erode adjacent levees (California Central Valleys Flood Control Association 1960).

Feather River Levees and Local Reclamation

Levee District 1 (LD 1) was formed in April 1868, following a flood in 1867, to construct a portion of the present levees along the Feather River. The Green Act of 1868 fixed the present district boundaries. The flood of 1867 took out the existing levee across Gilsizer Slough. The levee broke again at Gilsizer Slough in 1871. From 1871 on, as hydraulic mining debris raised the bed of the Feather River channel, it was necessary to raise the existing levees and construct and maintain a back levee to protect the district from the waters in Sutter Basin between the Sacramento and Feather Rivers, which overflowed during high-water stages.

Realizing that the levee crown of the Feather River was too close to a possible flood stage, based on past floods and the possibility of the levee being overtopped, LD 1 decided to slab the sides and raise the crowns of all the levees 5 feet above the estimated flood plain. This project consisted of raising the Feather River levee from the south boundary of LD 1 to the wagon bridge between Yuba City and Marysville. Work started in 1905 and was carried on in different locations along the Feather River until the flood of March 1907. Two breaks occurred on the levee, one on the Starr Bend north of Yuba City and one on the Holmes tract, about 5 miles south of Yuba City (Levee District 1 2009).

Nearly all of LD 1, including Yuba City, was flooded and much of the uncompleted dredger levee was washed away. The dredge work continued on the levee between Star Bend and Yuba City, and work was completed on a sand levee between Shanghai Bend and Yuba City when a flood occurred in 1909. The flood reached an elevation about 1 foot higher than the top of the levee in the pocket where the old bow levee joined the sand levee at Shanghai Bend. A break occurred in the sand levee at its junction with the old bow levee, which eroded to an 800-foot gap, and another break occurred in the sand levee halfway between Shanghai Bend and Yuba City, which eroded to a 2,600-foot gap. These breaks allowed water to overflow the lands between the sand levee and the old original levee along the Garden Highway. The sand levee constructed by the dredger on an alignment slightly east of the original earth levee was washed out, the water overflowed the old levee, and another break occurred just south of Shanghai Bend. During the year following the 1909 flood, the dredger filled the breaks in the sand levee. The moving of sand deposited by the dredger away from the river created a slope of 6–7 feet (Levee District 1 2009).

In 1938, USACE rebuilt the sand levee from Shanghai Bend to Yuba City. The levee was maintained by LD 1 from that time until 1955. In December 1955, California experienced heavy rains. As a result, a large boil exploded between Shanghai Bend and Yuba City. Nearly all of Yuba City was inundated, and 37 people were killed. The levee was rebuilt by USACE, affirming the critical role flood control plays in the regional economy.

I.2 Previous Studies

Table I-2 lists studies that have been completed within the vicinity of the action alternatives.

Table I-2. Previous Studies

Study #	Year	Author(s)	Title
01047	1990	Bouey, P.	Sacramento River Flood Control System Evaluation, Marysville- Yuba City Area
01133	1980	Holman, M., and M. Clark	Archaeological Reconnaissance of the Feather River Project Area: Proposed Feather River Sand and Gravel Quarry
01405	1995	McGowan, D.	Cultural Resources Inventory Report of the Therm II Power Project
01485	1996	Storm, D.	Archaeological Investigations along the Feather River near Nicolaus, Audubon Sanctuary
02666	1998	Dietz, F.	Cultural Resources Assessment within Levee Districts 1 and 9, Maintenance Area 3
03134	1997	Shapiro, W. et al.	Archaeological Assessment within Levee District 1 and 9, Maintenance Area 3
06868	2005	Selverston, M. et al.	Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing FERC Project No. 2100
07154	1992	Offerman, J.	Negative ASR: Extension of State Route 65 as a Connection between Routes 70 and 99 in Yuba and Sutter Counties
07165	2005	Quidachay, K., and S. Baxter	Cultural Resources Inventory Report for the Yuba Water Treatment Plant 24 to 30 MGD Water Supply Replacement Project
08002	2006	Sikes, N.	Cultural Resources Inventory for the City of Live Oak General Plan Update, Sutter County

Study #	Year	Author(s)	Title
08783	2006	Neuenschwander, N.	Determination of Eligibility and Effect for the Proposed Feather River Setback Levee at Star Bend Project, Sutter County
08954	2007	Grant, J.	Cultural Resources Report for Geotechnical Borings along the Feather River, Sutter Bypass, and Wadsworth Canal
09539	2008	Leach-Palm, L. et al.	Cultural Resources Inventory of Caltrans District 3 Rural Conventional Highways
09954	2008	Berg, J.	Cultural Resources Inventory for the Pease-Marysville 60kV Transmission Line Project
10202	2008	Jensen, S.	Archaeological Inventory for the Proposed Live Oak Riverfront Boat Park Boat Ramp Project
10203	2008	Jensen, S.	Archaeological Inventory for the Proposed Gridley Boat Ramp Project

FERC = Federal Energy Regulatory Commission

MGD = million gallons per day

kV = kilovolt

I.3 Native American Correspondence

As part of the identification efforts for cultural resources, ICF staff requested a list of Native American contacts from the Native American Heritage Commission (NAHC) and a search of the Sacred Lands File maintained by the NAHC. The NAHC responded by letter on March 22, 2012, by providing a list of contacts and indicating that there are no resources identified for the project area in the Sacred Lands File. ICF contacted all parties identified in the NAHC list by letter on September 28, 2012.

I.4 Identified Resources Affected by the Action Alternatives

This section of this appendix provides an overview of the identified resources that may be affected by the action alternatives. This section has been prepared to provide factual basis describing why these resources are likely to be historical resources under the California Environmental Quality Act (CEQA) and historic properties under the NRHP. This section also provides description of the probable effects of the project and the reasons why preservation in place of all potentially eligible resources may not be feasible.

I.4.1 Archaeological Resources

I.4.1.1 CA-BUT-52

This resource consists of a prehistoric "mound" site approximately 91 meters in diameter with midden. Midden consists of organic material deposit during human habitation that is frequently useful in archaeological research for analysis of subsistence and settlement patterns. Mound sites consist of sites that were originally elevated above grade and formed low mounds relative to the surrounding landscape. Burials are also typically found in mound sites. Because any remaining

portions of the site may be useful in providing data for archaeological research and because burials frequently contain grave goods that may be used to identify specific time periods of habitation, this site may have both integrity and data potential (NRHP Criterion D/California Register of Historical Resources (CRHR) Criterion 4). For these reasons it may qualify as an historical resource and historical property.

I.4.1.2 CA-BUT-53

This resource consists of a prehistoric midden and mound site approximately 61 meters in diameter. The site contains human burials, projectile points (*arrowheads*), ground stone artifacts, and shell ornaments. Because any remaining portions of the site may be useful in providing data for archaeological research (NRHP Criterion D/CRHR Criterion 4) and because burials frequently contain grave goods that may be used to identify specific time periods of habitation, this site may have both integrity and data potential. For these reasons it may qualify as an historical resource and historical property.

I.4.1.3 CA-BUT-465

The resource consists of a feature of axe-cut trees, tailings, a road, and other features within an expansive landscape composed of intact and historic-era mined tailings, levees, ponds, original landscape remnants, and other features made between 1898 and 1952 (the larger resource is recorded as CA-BUT-1345). This resource is associated with the significant historical theme of gold mining. This resource is also potentially useful in studying historic-era activity associated with this theme (NRHP Criterion D/CRHR Criterion 4). Because the resource is expansive it likely has at least some portions with the ability to convey this significance. For these reasons it may qualify as an historical resource and historical property.

I.4.1.4 CA-BUT-1123

This resource consists of a prehistoric deposit spanning 90 meters with human remains and "invertebrate fragments." Flaked stone tools and ground stone artifacts were noted. If the site retains portions with integrity and useful information it may be valuable for research domains (NRHP Criterion D/CRHR Criterion 4). For these reasons it may qualify as an historical resource and historical property.

I.4.1.5 CA-BUT-1345

The resource consists of an expansive landscape composed of intact and historic-era mined tailings, similar to CA-BUT-465. This resource is associated with the significant historical theme of gold mining. This resource is also potentially useful in studying historic-era activity associated with this theme (NRHP Criterion D/CRHR Criterion 4). Because the resource is expansive it likely has at least some portions with the ability to convey this significance. For these reasons it may qualify as an historical resource and historical property.

I.4.1.6 CA-SUT-5

This resource consists of a midden and mound site measuring approximately 30 meters in diameter. The deposit contains midden, glass and clamshell beads, a bone awl, and a pestle (a ground stone implement). Because any remaining portions of the site may be useful in providing data for

archaeological research and because burials frequently contain grave goods that may be used to identify specific time periods of habitation, this site may have both integrity and data potential (NRHP Criterion D/CRHR Criterion 4). For these reasons it may qualify as an historical resource and historical property.

I.4.1.7 CA-SUT-10

This resource consists of a midden and mound site measuring approximately 60 meters in diameter. The deposit contains midden, burials, shell beads, and shell pendants. Because any remaining portions of the site may be useful in providing data for archaeological research and because burials frequently contain grave goods that may be used to identify specific time periods of habitation, this site may have both integrity and data potential (NRHP Criterion D/CRHR Criterion 4). For these reasons it may qualify as an historical resource and historical property.

I.4.1.8 CA-SUT-20

This prehistoric resource consists of a midden deposit of uncertain dimensions, with shell beads and ornaments and burials. Because these materials are useful in prehistoric research (NRHP Criterion D/CRHR Criterion 4) and because the portions of the site may remain with integrity to provide this utility, this site may qualify as an historical resource and historical property.

I.4.1.9 CA-SUT-77

This resource contains midden soil, with shell, bone, flaked stone debris, in a deposit spanning 10 meters in diameter. Other noted artifacts include shell beads, a projectile point, and a bone ornament. The identified deposit is consistent with expectations for a habitation site with a burial component such remains and documented cultural constituents may be useful in prehistoric research (NRHP Criterion D/CRHR Criterion 4). Because portions of the site may remain with integrity to provide this utility, this site may qualify as an historical resource and historical property.

I.4.2 Built Environment Resources

I.4.2.1 Residential Historic District in Yuba City (Potentially NRHP- and CRHR-eligible)

There are 11 residential buildings located in the project area along 2nd Street in Yuba City that are associated with a potential NRHP- and CRHR-eligible historic district. The boundary for the potential residential historic district would include the east and west sides of 2nd Street between Garden Highway and C Street, and possibly extend a few blocks west of this area. The area appears eligible for listing in the NRHP under Criteria A and C (CRHR Criteria 1 and 3), at the local level of significance in the areas of residential community development and architecture. The period of significance is approximately circa 1870 to approximately 1940 for the district and its contributing resources. The district comprises Yuba City's earliest collection of residential buildings and highlights architectural styles such as Italianate, Craftsman, and Queen Anne Victorian. Table I-3 below describes 11 residential buildings located in the area of potential effects (APE) that are individually eligible and those that would be contributing resources to the potential historic district.

Table I-3. Contributing Elements of the Yuba City Residential Historic District

APN	Address	Resource Name if	Architectural	Eligibility Cuitouia*		
52-552-007		Applicable William O'Banion House	Style Italianate	Eligibility Criteria* Eligible under NRHP Criteria A and C individually and as a potential historic district contributor		
52-552-006	335 2nd Street	NA	Craftsman	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-552-005	341 2nd Street	NA	Craftsman	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-552-004	349 2nd Street	NA	Craftsman	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-552-003	355 2nd Street	NA	Prairie	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-552-002	365 2nd Street	NA	Prairie	Eligible under NRHP Criteria A and C individually and as a potential historic district contributor		
52-552-001	373 2nd Street	NA	Craftsman	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-535-007	379 2nd Street	McGruder House	Queen Anne Victorian	Eligible under NRHP Criteria A and C individually and as a potential historic district contributor		
52-535-006	407 2nd Street	NA	Queen Anne Victorian	Eligible under NRHP Criteria A and C as a potential historic district contributor		
52-535-005	413 2nd Street	G.W. Carpenter House	Queen Anne Victorian	Eligible under NRHP Criteria A and C individually and as a potential historic district contributor		
52-535-004	423 2nd Street	Thomas D. Boyd House	Neoclassical	Eligible under NRHP Criteria A and C individually and as a potential historic district contributor		

NA = not applicable.

NRHP = National Register of Historic Places.

I.4.2.2 Sutter County Office Building/Courthouse—APN 52-534-001

The Sutter County Office Building located at 463 2nd Street was built in 1953 and designed by master architect Harry J. Devine. The building and associated detached garage appears to meet the eligibility criteria for listing in the NRHP and CRHR under Criterion C and Criterion 3, respectively, as an excellent example of an International-style government building in Sutter County.

I.4.2.3 Masonic Temple—APN 52-516-004

The Masonic Temple located at 501 2nd Street in downtown Yuba City appears eligible for listing in NRHP and CRHR under Criterion C and Criterion 3, respectively, at the local level of significance as an excellent example of an early reinforced concrete building constructed in the Mission Revival style.

^{*}Resources are also CRHR-eligible under parallel CRHR criteria

I.4.2.4 Gridley Workers Camp Historic District—APN 024-220-030

The Gridley Workers Camp Historic District is located at 850 East Gridley Road in the city of Gridley. The contributing resources associated with the historic district are 25 wood frame units constructed in 1938 by the Farm Security Administration. The district is eligible for listing in the NRHP and CRHR under Criterion A and Criterion 1, respectively, for its association with the Farm Security Administration's efforts during the Great Depression to address the health and housing crisis. The district is also eligible for the NRHP and CRHR under Criterion C and CRHR Criteria 3, respectively, as an excellent example of Farm Security Administration's vernacular architecture and landscape design.

I.4.2.5 Feather River Levee

The Feather River Levee is eligible for the NRHP and CRHR under Criterion A and Criterion 1, respectively, for its association with advances in flood control in California.

I.4.2.6 P-1340 Sutter Butte Canal

The Sutter Butte Canal (P-1340) appears eligible for listing in the NRHP and CRHR under Criterion A and Criteria 1, respectively, at the local level of significance for its associated with the development of agricultural irrigation in Sutter and Butte Counties.

I.4.2.7 Southern Pacific Shasta Route Historic District (alignment segment and bridge)

Contributing elements of the Southern Pacific Shasta Route Historic District (SPSRHD) are located in the APE. The historic district has been determined eligible for the NRHP under Criteria A, B, and C (CRHR Criteria 1, 2, and 3) with a period of significance of 1863 to 1945. Under Criterion A the district is historically associated with engineering, transportation history, economic history in California and Oregon, as well as the development of the West. The SPSRHD is also NRHP eligible under Criterion B for its association with railroad mogul E.H. Harriman. The bridges located along the route that were built according to the railroad's "Common Standard" design are also NRHP eligible under Criterion C as they represent the particular type, period and methods on construction for railroad bridges built during the period of significance. The rail alignment in the APE is approximately 2,680 feet long and includes a wooden trestle bridge that dates to 1939.

I.4.3 Potential Effects and Treatment

Table I-4 identifies archaeological resources affected by the action alternatives and potential treatment options. Table I-5 lists the built environment resources affected by the action alternatives and potential treatment options.

Table I-4. Archaeological Resources Affected by the Action Alternatives and Potential Treatment

County	Primary	Trinomial	Alt. 1	Alt. 2	Λ1+ 2	Potential Treatment / Pagis for Treatment*
County	Number	THIOIIIIai	AIL. I	AIL. Z	AIL. 3	Potential Treatment/Basis for Treatment*
Butte	P-04-52	CA-BUT-52	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Butte	P-04-53	CA-BUT-53	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Butte	P-04-465	CA-BUT-465	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Butte	P-04-1123	CA-BUT-1123	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Butte	P-04-1345	CA-BUT-1345	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Sutter	P-51-05	CA-SUT-5	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Sutter	P-51-10	CA-SUT-10	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Sutter	P-51-20	CA-SUT-20	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint
Sutter	P-51-77	CA-SUT-77	SE	SE	SE	Data Recovery/Construction Constrained by Existing Footprint

Alt = alternative; SE = significant effect.

*Treatment is conservatively estimated to require data recovery rather than preservation in place because construction is constrained to the existing footprint of flood control features. Alternative right-of-way on the landside of the Feather River that would avoid all cultural resources is not a feasible location for levee improvements because substantial construction has been invested in existing features. While the proposed improvements may not directly intrude on the boundaries of identified features some boundaries are being refined through ground-truth excavation. In addition construction activity areas such as staging, access, driving, and ancillary work may result in disturbance of known or previously unidentified boundaries. For these reasons, avoidance of direct effects may be infeasible.

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Table I-5. Built Environment Resources Affected by the Action Alternatives/Potential Treatment

ADM	A J J	Committee	Alt. 1	Alt. 2	Alt. 3	Probable Treatment*/ Reason for Not Preserving in
APN	Address	County	Effect	Effect	Effect	Place
52-552-007	329 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-006	335 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-005	341 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-004	349 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-003	355 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-002	365 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-552-001	373 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-535-007	379 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-535-006	407 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-535-005	413 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-535-004	423 2nd Street	Sutter	SE	SE	NS	HABS/Relocate
52-534-001	463 2nd Street	Sutter	SE	SE	SE	HABS/Relocate
52-516-004	501 2nd Street	Sutter	SE	SE	NE	HABS/Relocate
024-220-030	850 East Gridley Road	Butte	NS	SE	SE	HABS/Relocate
Feather River Levee	Entire APE	Sutter and Butte	NS	NS	NS	NA/Treatment not required (HAER if effects identified)
P-1340. Sutter Butte Canal	Ends near the junction of Levee Rd & Clark Road	Sutter	SE	SE	SE	HAER
Southern Pacific Shasta Route Historic District (alignment segment and bridge)	Near Live Oak Blvd and Pease Road (north of Yuba City)	Sutter	SE	SE	SE	HAER

Alt = alternative; SE = significant effect; NS = not significant; NE = no effect; HABS = documentation per Historic American Building Survey; HAER = documentation per Historic American Engineering Record; NA = not applicable.

*Treatment is conservatively estimated to require documentation or relocation rather than preservation in place because construction is constrained to the existing footprint of flood control features. Alternative right-of-way on the landside of the Feather River that would avoid all cultural resources is not a feasible location for levee improvements because substantial construction has been invested in existing features. Proposed improvements may result in direct or indirect effects. Direct effects consist of demolition of the whole or portion of a resource removing its ability to convey its significance. Indirect effects consist of changes to the setting that diminish the necessary surrounding feeling and association required for the resource to convey its significance. Construction of improvements may result in direct or indirect effects because the proposed improvements will introduce a wider levee prism or require removal of encroachment; including structures that are register-eligible resources.

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